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THE BALSAM OF LIQUIDAMBAR STYRACIFLUA.

By William Landon Harrison, G. P.

An Inaugural Essay.

This balsam, commonly known as sweet gum, is a natural exudation from *Liquidambar styraciflua*, a tree belonging to the natural order *Hamamelacæ*, sub-order *Balsamifluæ* (Gray). It is indigenous to nearly all parts of the United States, growing most abundantly in the southern portion. It seems to prefer moist localities, as swamps, the banks of rivers, etc., though it is often found in elevated situations and quite distant from water. In favorable situations, and when matured, it reaches the height of fifty to sixty feet, with a diameter of two to four feet.

The trunk is covered with a grayish, deeply-furrowed bark, and the branches have thick corky ridges running their entire length. The leaves are palmate, deeply five- to seven-lobed; lobes pointed, smooth and shining; of a bright green color, becoming crimson in autumn.

The flowers are mostly monœcious, in globular heads or catkins; the sterile arranged in a conical cluster, naked, stamens numerous, filaments short. The fertile flowers consist of many two-celled, two-beaked ovaries, subtended by minute scales in place of calyx, all more or less cohering and hardening in the fruit, forming a spherical catkin; styles two; ovules many, but only one or two perfecting.

The balsam is obtained from incisions in the bark. As it first exudes it is of a yellowish color, and of the density of thick syrup; by standing it thickens, and after some time becomes darker in color and finally perfectly hard. On being broken, in the latter state, the fracture presents a variegated appearance, from a dark brown to

spots of a pure white color. It has a pleasant benzoinic odor, and a balsamic and somewhat burning taste. It is soluble in alcohol, ether, chloroform and fixed oils: its alcoholic solution slightly reddening litmus paper.

With the view of ascertaining its constituents, a specimen, collected in south-eastern Virginia, was submitted to the following treatment:

Four ounces avoirdupois of the balsam, in a semi-liquid state, was distilled with an aqueous solution of sodium carbonate as long as any oil continued to come over. The distillate contained, floating on the surface of the water, about half a drachm of colorless oil.

The liquid remaining in the retort was filtered from the resin, and sulphuric acid in slight excess added to decompose the cinnamate of sodium. The result was a copious deposit of a light yellowish color. This was collected and washed on a filter till free of sulphuric acid; it was then dried and heated with hot petroleum benzin, which dissolved all except a little brown resinous matter. The benzin solution, while still hot, was decanted into another vessel, and allowed to cool. It was then found to have deposited all the acid, in small, perfectly white, needle-shaped crystals.

The liquid filtered from the precipitate, obtained by decomposing the first solution by sulphuric acid, appeared quite cloudy, and by tests was found still to contain some cinnamic acid. It was carefully evaporated to dryness, and the residue treated with boiling benzin, which, on being decanted and allowed to cool, deposited a small amount of a white amorphous powder. This was collected, and all the benzin having been removed by careful heating, was boiled with a small quantity of water. It was readily dissolved, the solution giving an acid reaction, and on cooling deposited quite a quantity of long, colorless, acicular crystals. These were dried and treated with hot benzin, which at once dissolved them, and on cooling deposited them in the usual-shaped crystals of cinnamic acid.

As the decompositions in its amorphous condition were identical with those of crystallized cinnamic acid, and as it was converted into a crystalline state simply by dissolving in water, in its amorphous condition it must have been cinnamic anhydride.

The amount of impurities in the balsam (consisting of pieces of bark, dirt, etc.), was 160 grs.; this deducted from the original weight, 4 oz. avoirdupois, leaves 1590 grs. of pure balsam operated upon; the amount of acid obtained was 88 grs., making a yield of about 5½ per cent.

It agreed with the following reactions of cinnamic acid (see "*Gmelin's Hand-Book of Chemistry*"):

Heated on platinum foil, it first fuses and then takes fire, burning with a fuliginous flame, and evolving peculiar stifling and irritating fumes. Cold oil of vitriol colors it yellow, and then dissolves it with evolution of heat, forming a clear brownish liquid, which, on the addition of water, deposits a small quantity of a brownish-white powder (sulpho-cinnamic acid). Hypochlorite of calcium converts it first into oil of bitter almonds, with its characteristic odor, and then into benzoate of calcium. Sulphuric acid and bichromate of potassium also convert it into oil of bitter almonds and finally into benzoic acid, the same effect being produced by other oxidizing agents.

The resin remaining after the extraction of the cinnamic acid was treated with boiling petroleum benzin, the liquid decanted and allowed to cool, when a yellowish-white oily-looking mass was deposited. This was proven to be styracin, rendered amorphous by heat. The vessel containing it and the benzin was set aside in a moderately coo place, and allowed to stand for several weeks. On then examining it, the yellowish mass was found to have become crystalline, and quite a quantity of styracin in clusters of white acicular crystals had been deposited on the sides of the vessel above the surface of the benzin. The property of being rendered amorphous by heat and recrystallizing on standing, as well as the manner of crystallizing above the surface of the liquid, are mentioned by Gmelin as characteristic of styracin. The specimen under examination also afforded the following reactions of styracin:

Treated with nitric acid it is changed into a yellowish pulverulent substance, evolving at the same time the odor of oil of bitter almonds. With sulphuric acid and bichromate of potassium it also evolves the odor of oil of bitter almonds. Treated with sulphuric acid alone, either hot or cold, it is charred. It is completely insoluble in water, either hot or cold, soluble in alcohol, and more freely in ether. It does not combine with or dissolve in solution of lime, even at boiling heat, neither does it dissolve in solution of ammonia. Heated with potassium hydrate, it is converted into cinnamate of potassium, and a brown resinous-looking substance, with a pleasant odor, resembling that of cinnamon. It does not combine with acids, but is rendered more soluble by them, *e. g.*, the solution of one part styracin in eight of boiling alcohol becomes turbid on cooling, but is immediately rendered perfectly clear by the addition of a little sulphuric acid.

The volatile oil, styrol, obtained by distillation, seems identical with that from storax. It is a carbo-hydrogen, nearly colorless, of a peculiar aromatic odor resembling the balsam, and has a persistent, burning taste. It is slightly soluble in water, and imparts to it, in a marked degree, its peculiar odor; very soluble in alcohol, ether and the fixed oils. Sulphuric acid has no marked effect upon it. Treated with nitric acid it is converted into a reddish resinous-looking substance, evolving an odor almost identical with that of oil of turpentine.

The resin remaining after the cinnamic acid, styracin and styrol had been extracted, was of a dark brown color, nearly odorless and tasteless; entirely soluble in alcohol and ether and insoluble in bisulphide of carbon.

In the *American Journal of Pharmacy* for May, 1860, Mr. W. P. Creecy, of Mississippi, in an inaugural essay on this balsam, states that the acid obtained by sublimation gave no odor of oil of bitter almonds when treated with hypochlorite of calcium, and hence he concluded that it was benzoic acid. Not having been able to detect the presence of benzoic acid in the balsam, and doubting its existence, the above-mentioned experiment was repeated in this case, but with different results. A portion of the balsam was mixed with sand and carefully heated in Mohr's apparatus for benzoic acid. A sublimate was obtained, consisting of white acicular crystals, with a slight empyreumatic odor. A portion was treated with hypochlorite of calcium, and at once gave the decided and characteristic odor of oil of bitter almonds, thus proving that it was cinnamic and not benzoic acid, as averred by Mr. Creecy.

If benzoic acid exists in the balsam at all, it must be in very minute quantity, as all the methods applied failed to detect it.*

The use of petroleum benzin in obtaining cinnamic acid in a pure state (a suggestion of Prof. Maisch) was found highly preferable to alcohol, which is the solvent recommended by Gmelin and others. Benzin dissolves only the acid, and on cooling deposits it in a pure state, free of all traces of resin and coloring matter. Alcohol also dissolves the acid, but takes up along with it the adhering resin, rendering it difficult to purify. The acid is also more soluble in alcohol than in benzin, and hence the loss in the mother liquid is greater.

* See also Prof. Procter's paper in the *American Journal of Pharmacy*, 1866, p. 37.

The same advantages from the use of benzin will also be observed in extracting styracin.

The foregoing experiments serve to show the very close analogy between the balsam of *Liquidambar styraciflua* and that of *L. orientale*. In this case the balsam of the former was treated in the manner given by Gmelin in the examination of storax, and precisely the same result obtained, and in similar quantities. The balsam also somewhat resembles storax in its physical properties; the tree producing it belongs to the same natural order, and hence it is natural to conclude that by a proper treatment of the fresh bark, a product similar to, and answering all the purposes of, liquid storax, may be obtained.

ON THE BALSAMS OF *LIQUIDAMBAR STYRACIFLUA* AND *ORIENTALE*.

By John M. Maisch.

The experiments detailed in the essay of Mr. Harrison, and the interesting results obtained by him, leave no doubt of the identity of the balsamic exudations as obtained from the Asiatic and American species of the genus Liquidambar. The difference in their physical appearance is readily accounted for by the different methods employed in obtaining the storax of commerce, and the so-called sweet gum of our Southern States. While the latter, even after having become dark-colored by exposure, is perfectly transparent in thin layers, the former is of a peculiar grey color and opaque, until the water which it contains has been expelled by heat or allowed to settle by long standing, in which latter case the lower stratum will retain the opacity of the commercial article, while the superior stratum will have assumed the perfect transparency which the *natural* exudation of *L. orientale* undoubtedly possesses, though the color of the latter is likely to be and remain lighter than that of the clarified storax. If these premises are correct, it was to be expected that the introduction of water into the sweet gum should produce an opaque article, resembling storax in appearance. An experiment made by Mr. Harrison at the laboratory of the Philadelphia College of Pharmacy, proved the correctness of the inference stated; when sweet gum was heated in a water-bath, together with a small quantity of water, and frequently stirred, the balsam assumed a grey color, and remained opaque after cooling. I have no doubt that the resemblance to storax will be still greater if

the recent bark of *Liquidambar styraciflua* is properly comminuted and carefully steamed or digested in warm water and afterwards expressed.

Several other experiments made by Mr. Harrison deserve to be mentioned, as possessing considerable interest.

In 1871, while preparing the proximate principles of storax, I observed the solubility of styracin in petroleum benzin, and at the February (1872) meeting of the Philadelphia College of Pharmacy exhibited* some of the products obtained, among them styracin prepared by the processes of Simon and of Toel, which could not be obtained pure by crystallization from alcohol without sustaining great loss; also styracin which had been obtained from storax previously exhausted by carbonate of sodium, by treating the residue directly with hot petroleum benzin, which on cooling deposited it at once pure. It may be mentioned here that this storax residue was repeatedly treated in the same manner, when it was observed that the later deposits were amorphous, but became crystalline after some time, the interval becoming longer after each subsequent treatment, until finally a portion was obtained but slightly yellowish in color, rather soft and perfectly transparent; in this portion the change into the crystalline state did not commence until about two years after the experiment had been made, and even now, after a period of thirty-two months, has not been completed, notwithstanding the mass has been occasionally stirred. The statement of Toel that fused styracin which refuses to crystallize, congeals rapidly into stellately arranged needles, on being touched with a pointed instrument, must be modified with the proviso that the heat be not applied too long or too frequently after short intervals.

After Mr. Harrison had observed cinnamic acid to be readily soluble in hot petroleum benzin, he proved also, experimentally, that this acid and styracin are taken up together, from sweet gum as well as storax, by the menstruum mentioned, and crystallize together on cooling; the snow-white crystals yielded to dilute ammonia all the cinnamic acid, leaving the styracin behind, and the ammoniacal solution giving with muriatic or sulphuric acid a white precipitate of cinnamic acid. This appears to be by far the quickest way of obtaining perfectly pure cinnamic acid from storax, if the loss of styrol is of no consequence; and, in case styracin is not desired, the mixture of styracin

* See Amer. Journ. of Pharm., 1872, p. 134.

and cinnamic acid may be distilled with caustic soda solution, when styron (cinnamic alcohol) is found in the distillate, while the residuary alkaline liquid, on being supersaturated with muriatic acid, yields all the cinnamic acid.

Treatment of either of the two balsams with hot solution of sodium carbonate removes all cinnamic acid; the styracin obtained from the residue of sweet gum by petroleum benzin was found by Mr. Harrison not to contain any free cinnamic acid, and the styracin prepared by me from storax in 1871 was equally pure.

The so-called sweet gum is used medicinally in some sections of our Southern States, as it seems, principally as a stimulating expectorant. Mr. Oscar L. Smith, in a letter dated Savannah, Ga., Sept. 30, 1873, informed me that it is popular there with physicians, who employ it in the form of syrup or tincture; both preparations are made by the formulas of the U. S. P. for the corresponding preparations of tolu, and are used in about the same manner as the latter. Near Savannah the balsam is collected by negroes, but the supply is frequently inadequate for the demand.

CORTEX JUGLANDIS CINEREÆ.

By Edward Seymour Dawson, Jr., G. P.

Condensed from an inaugural essay.

The butternut tree is found throughout the New England, Middle and Western States, and Canada, growing in rich woods, on elevated river banks, and on cold uneven rocky soils. Early in the spring, immediately before the leaves unfold, a saccharine juice, which furnishes a good sugar, is obtained by tapping the tree. The wood of the tree is light, of a reddish hue, not apt to become worm-eaten, and is often used in paneling and ornamental work. The fruit, collected previous to its ripening, is used by many persons in the form of a pickle, and in Germany, as I have been informed, the fruit of *Juglans regia* is macerated in liquor with spices, and thus furnishes a sort of elixir which is used as a tonic in dyspepsia. The bark of the tree, and husks of the nuts, furnish a dye of a chocolate color for woolen goods. The bark and leaves of the tree are, practically, the only medicinal portions, but the former only is recognized by the U. S. Pharmacopœia, under the name of "*Juglans*," and it is directed that the inner bark of the root collected in May or June, should be used, but, from my observations, bark collected in July, is as efficacious as that col-

lected earlier. I would not recommend the use of bark that has been collected earlier than May, for I found that some collected in April yielded an extract which had a sweetish insipid taste, and was decidedly less strong than that made from bark collected later. The bark used for my analysis was obtained from the stem of the tree, and was collected during the month of July, 1873. It was from $\frac{3}{8}$ to $\frac{3}{4}$ of an inch thick, and consisted of a liber ranging from $\frac{1}{4}$ to $\frac{1}{2}$ inch in thickness, which was covered with a grayish-colored corky layer. The corky layer was marked with irregular longitudinal fissures, and penetrated very unevenly into the liber. When first taken from the tree the liber was *white*, but on exposure to the air, it first acquired a lemon-yellow, and ultimately a deep brown, almost black color. The odor was quite strong and peculiar, and the taste was bitter and very acrid. When the liber is chewed, it stains the saliva yellow, and leaves a brownish stain upon the tongue. Having freed the liber from the layer of cork, I carefully dried it, and, upon examining it, found that its inner surface was quite smooth, that its transverse fracture was somewhat fibrous, and that its longitudinal fracture was quite uneven. A cross section of the liber shows the bast fibres to be placed tangentially, and it has a checkered appearance, which is caused by the radial medullary rays crossing the tangential rows of bast fibres. In the fresh, undried bark, the fracture shows white edges, which quickly change color from lemon-yellow to brown, but in the dry bark the fractured edges do not change color, unless they be moistened with water. Unless the bark is dried immediately after being collected, it becomes of a deep brown color throughout, and loses its bitter, acrid taste, and acquires an insipid, resinous taste. Whether this change of color and taste affects the medicinal virtues of the bark, I cannot say, but I would recommend that the bark be dried at once after collection. While trimming the bark, my hands were stained a decided brown color, which I found very difficult to remove. Butternut bark possesses mild cathartic properties, and has acquired considerable reputation in bowel affections, particularly in cases of dysentery. It is given in the form of decoction or extract, never in substance. An extract of the bark is officinal in our Pharmacopœia under the name of extractum juglandis, and when given in doses of grs. v—x, acts as a laxative, and in doses of grs. xx—xxx, as a purge. Under the name of juglandin, there appears in commerce an eclectic resinoid, which is obtained by exhausting the offici-

nal bark with alcohol (sp. gr. ·835), mixing the resulting tincture with half its bulk of water, distilling off the alcohol, and then removing the resin, which is suspended in the aqueous residue, and washing and drying it. This resin, in doses of grs. 2—5, is said to act as a diuretic and cathartic, but that which I obtained, when taken in 5 grain doses, had more of a diuretic effect than cathartic, and I do not think that any decided medicinal virtues can be attached to it. Butternut bark has for a long time been used in domestic practice, and by that means, probably, became known to our medical profession, with whom, at one time, it enjoyed considerable reputation, but has now become almost obsolete with our city physicians, although it is still used to quite an extent by country practitioners. I have found that a tincture of the bark, of such a strength, that fl. ℥ xvi of it will represent two troy ounces of the powdered drug, (the menstruum being diluted alcohol); forms a handsome, permanent preparation, and when given in doses of fl. ʒi—ij, acts most decidedly as a cathartic. A fluid extract made according to the Pharmacopœia formula for extract. cinchonæ fl., forms a preparation which fully represents the odor, taste, and medical properties of the bark.

Mr. C. O. Thiebaud, in 1872,* made a very interesting investigation of the constituents of butternut bark, and found, among others, a volatile acid: juglandic acid, which he considered allied to chrysophanic acid, and also an acid crystallizing in flat tabular crystals. The solvent used by him in isolating the above constituents, was true benzole. In prosecuting my analysis of the bark, I followed, to a certain extent, the course adopted by Mr. T., substituting, however, petroleum benzin for a solvent in place of benzole, but the results of my investigation do not entirely correspond with his.

In the cold infusion, which had an acrid taste, the author found neither albumen or alkaloid; to the incompatibles mentioned by Mr. Thiebaud (loc. cit. p. 255), Mr. Dawson adds potassium ferrocyanide, mercuric chloride and tartar emetic; gelatin likewise produced a precipitate, and tannin appears therefore to be present.†

* American Journal of Pharmacy, 1872, p. 253.

† The discrepancy between the statement of Mr. Dawson and Mr. Thiebaud may perhaps be explained by the bark used by the former having been carefully and rapidly dried immediately after collection; it is not unlikely that thereby the decomposition of the tannin may be partly prevented.—Editor Amer. Journ. Ph.

Trommer's test indicated sugar in the infusion, which had dissolved about one-sixth of the total weight of the bark, and separated on standing and evaporation, some greenish resinous matter. The bark exhausted by cold water, yielded starch to boiling water.

The decoction of the bark resembles the infusion, but is destitute of its acrid taste. The precipitate with acetate of lead, when decomposed by H_2S, evaporated and exhausted by alcohol, furnished on evaporation an amorphous black residue, which was precipitated by gelatin, ferric chloride and tartar emetic, and therefore contains some tannin. The filtrate from the lead precipitate contained principally sugar.

The bark (℥j), which had been exhausted with hot water in preparing the decoction, was thoroughly dried, and then macerated in petroleum benzin, in a warm place for several days, whereby a yellow liquid was obtained, which, on evaporation, yielded a rather thick oily residue. This residue, when entirely free from benzin, was found to weigh grams 4 58, which shows for the bark a yield of a trifle over 14 per cent. of fixed oil. It has a dark red color, slight odor, and a peculiar, slightly pungent taste. At 60° F., it is quite fluid, but between 40° and 50° F, becomes partly solid, owing to the separation of a crystalline body, which is probably stearin. At 20° F., it solidifies into an opaque crystalline mass. Its specific gravity, obtained by means of a buckshot, is 0·9 at 55° F. The oil is sparingly soluble in 85 per cent. alcohol, almost entirely soluble in absolute alcohol, and freely soluble in ether, chloroform and benzole. It is readily saponified by KHO, and, when heated with the latter, yields a clear violet-colored solution, which, when diluted with water and treated with NaCl, yields a brownish soap that separates and rises to the surface.

Resin.—The troy ounce of bark, exhausted with hot water and benzin, was thoroughly dried and then macerated in 85 per cent. alcohol for 7 days. The tincture thus formed was mixed with half its bulk of water and subjected to distillation, till the alcohol was mostly removed. From the liquid remaining in the retort, about grams 0·2 of a greenish-brown resin was obtained, which weight does not appear to represent the whole amount of the resin.

It is entirely soluble in liquor potassæ, forming a deep violet-colored solution, from which it is precipitated by acetic acid provided the solution is concentrated, but if the latter is diluted it is not af-

fected by that acid. It is completely precipitated from either strong or diluted solutions by hydrochloric acid.

It seems to be slightly soluble in water, is sparingly soluble in chloroform, and insoluble in benzin. Ether dissolves about 50 per cent. of it. It fuses at 170° F. When heated on platinum foil it first fuses, and then takes fire, burning with a smoky, luminous flame.

Volatile Oil.—A portion of the bark was placed in a retort, mixed with a little more than enough water to cover it and subjected to distillation, whereby a yellowish distillate was obtained, which had a slight acid reaction, and a strong, peculiar, aromatic odor. From this, by cohobation, I finally obtained a colorless liquid, on the surface of which minute globules of oil could be seen floating. The odor of the volatile oil is peculiar, and not very pleasant. The yield was so very small that I could not determine anything in regard to it.

Volatile Acid.—About one troy ounce of the bark was treated as in the former experiment, and subjected to distillation. Before the contents of the retort had begun to boil, I obtained about half a fluid ounce of a bright yellow distillate, which was odorless; this I separated and set aside, and then continued the distillation till about six fluid ounces of a nearly colorless distillate had been obtained. The distillate first obtained was agitated with ether, till the latter ceased to be colored, and the ethereal solution was drawn off. This had a bright yellow color, and, on evaporating the ether, yielded an orange-yellow residue in which were numerous long acicular crystals, which had an acid reaction, and a hot, acrid taste. When treated with liquor potassæ, the crystals acquired a deep-violet color. This volatile acid probably constitutes the acrid principle of the bark, therefore we can readily understand why a long-boiled decoction of the bark is devoid of an acrid taste. The second portion of the distillate was not acid in reaction, and was not subjected to further investigation. It would almost seem as if this volatile acid was decomposed at the boiling point of the decoction, inasmuch as the condensed vapor of the liquid in the retort ceased to have a yellow color the moment the latter began to boil, and, also, ceased to have an acid reaction.

A fresh portion of bark, when treated with petroleum benzin, yielded an oily extract, from which neither alcohol or diluted alcohol would separate any crystalline principle. The extract, distilled with water, yielded a light yellow distillate, from which ether took up an oily matter which was not colored purple by alkalies. But the water

in the retort was deep red, and ether dissolved from it an olive-brown amorphous mass, becoming violet by alkalies. No better results were obtained on saponifying the oil with potassa, removing the soap by salt, acidulating with acetic acid and treating with ether; the residue was acrid, amorphous, of an acid reaction, colored violet by alkalies and stained the hands.

Commercial benzole was not employed by the author, because he observed it to leave a crystalline residue on spontaneous evaporation.

Air-dry bark yielded 5·3 per cent. of ashes, containing aluminium, magnesium, calcium, potassium and sodium, combined with carbonic, sulphuric, hydrochloric, phosphoric and silicic acids.

Note by the Editor.—The results obtained by Messrs. Thiebaud and Dawson leave no doubt that the juglandic acid of the former is identical with the *nucin* of A. Vogel, Jun., and Reischauer (see Gmelin's Chemistry, Cav. edit., vol. xvii, p 20), obtained from green walnut peel, and which is very readily altered in the presence of that principle, which in contact with the air, rapidly becomes brown-black, and which J. A. Buchner* named juglandic acid, but he did not succeed in isolating it. Nucin being sublimable at a temperature exceeding 80° C. (176° F.), its appearance in the watery distillate from the bark is easily accounted for, so that the volatile acid of Dawson and Thiebaud must be identical with the juglandic acid of the latter, as proven by the former by the behavior to alkalies. According to Reischauer and Vogel, subacetate of lead and alkaline borates and phosphates impart to nucin a beautiful purple red color, the same as caustic alkalies.

ON THE LOSS OF WEIGHT BY THE DRYING OF AIR-DRY DRUGS.

By George W. Kennedy, G. P.

In the April number of the "Journal" of 1872, page 156, will be found an article by the writer on the amount of moisture contained in air-dry drugs. The experiments were made during the months of January and February, and only show the loss and re-absorption for those two months.

*Buchner's Repertorium, 1843; lxxix, 355.

That examination is inadequate as a guide for the year, as some months are wet and others more dry, necessarily causing the drug to vary in the amount of moisture it contains.

Prof. Maisch suggested to me the importance of making a series of experiments with a number of drugs in each month during the year, for the purpose of ascertaining how much they would vary during wet and dry weather,* and thus to determine the importance of using only drugs that are thoroughly dried in the manufacture of the many galenical preparations, and especially tinctures, syrups and fluid extracts and the like, which must vary in strengtn as made from anhydrous or merely air-dry drugs. I give below the results of my experiments, commencing with January, and continuing during the year till December, 1873.

The operation was conducted in the following manner: The drug was weighed from the stock on hand about the first of each month, and then exposed to a heat of about 110° Fahrenheit in a common cooking stove oven until it ceased losing weight. The loss was noted, and the material was then exposed to the atmosphere until the end of the month, when it was re-weighed in order to find out how much moisture had been re-absorbed during the month. It will be found upon examination that the quantity of moisture lost and re-absorbed varies considerably, owing to the condition of the weather at the time when the drug was weighed; for instance, supposing at the first of the month the article was weighed in dry weather, the loss in moisture was invariably smaller than if it were weighed in rainy weather; then again at the end of the month, when the drug was re-weighed in wet weather, the amount of moisture re-absorbed was always larger.

The figures presented by the writer are as correct as they possibly can be, care having been taken to avoid the loss of material on the

*Our suggestion was not, to exsiccate the drugs every month for the purpose of ascertaining the percentage of moisture contained in them, but to make that determination once only, at the beginning of the year, and to reserve another portion of the same drug for the purpose of weighing it once or twice a month, in order to determine the *variation of the actual weight* of the drugs kept in the usual manner throughout the year. It is obvious that the *relative* strength of the galenical preparations of air-dry drugs would be the same, if the actual weight of these drugs did *not* differ throughout the year, in wet or dry weather, &c.; while in *actual* medicinal strength they are undoubtedly weaker than if they had been made from anhydrous drugs.—Editor Amer. Journ. Ph.

one hand, and excessive contamination with dust on the other hand. Sometimes two or three experiments in drying, &c., were made in order to satisfy myself that the results were correct.

In the following tables the I column for each month indicates the actual weight obtained from 100 parts of the drugs after drying as indicated above; the II column shows the actual weight of the same material at the end of the month; the difference between these and the first figures indicating the amount of moisture re-absorbed during the month. The remarks, Dry, Wet, &c., at the head of each column, describe the weather on the day the weight was taken:

DRUGS.	January.		February.		March.		April.		May.		June.	
	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.
	Dry.	Dry.	Dry.	Wet.	Damp	Dry.	Showery.	Dry.	Dry.	Dry.	Dry.	Wet.
1. *Roots and Rhizomes*												
Colchicum	88 80	97·15	88·20	96·60	88·00	96·00	88·20	96·00	88·90	96 80	88·60	98·50
Gentiana	89·00	97 50	89 60	98·25	88·90	97·15	89·10	96·77	89 50	97·10	89 20	98·00
Lappa	88·00	96·80	88·00	97·10	87·40	95·80	88·00	96·20	88·20	96·60	88 00	97·00
Podophyllum	88·80	97·05	88·90	97·30	87·80	96·70	88·25	96 05	88·80	96 60	88·50	97·10
Rheum	89 20	97·45	89 00	96·50	87·90	97·10	88·20	96·80	89·15	96 40	89·75	97·85
Senega	89·55	97·45	88 80	97·30	88·10	96·85	89·10	96·00	89·75	97·25	89 65	98 45
Serpentaria	88·75	97·00	88·40	97·35	87·00	96·10	87·90	96·15	88·75	96·90	88·00	97·00
Taraxacum	88·00	96·33	88·00	97·80	86·00	95 00	86·40	95·15	87·00	95·40	86·80	96·55
Valeriana	89·10	97·10	88·75	97·85	87·90	96·00	88·80	96·30	89·00	96·20	88·50	97·00
2. *Barks.*												
Cinchona rubra	89 80	97·30	89 30	97·70	88 10	96·00	88·80	95·20	89·00	95 00	89·00	96·90
Cinnamomum	89·10	96·98	89·00	97·75	88·00	96·10	88·50	96·50	88·90	96 00	88·80	97·30
Prunus Virgin.	89·67	97·57	89·60	98·00	88·50	96·70	89·25	96·65	89 20	96 70	89·70	97·70
Sassafras	89·25	97·35	89·00	97·90	87·20	95·00	89·10	96·45	89·00	94·20	89·00	97·20
3. *Leaves.*												
Aconitum	87·00	95·25	88·00	97·00	86·50	95·00	87·00	95·10	88 00	96·00	87·80	96·70
Belladonna	86·25	95·25	87 50	96·75	85·60	94·70	87·00	95·20	88·50	96·60	89 00	97·95
Buchu	88·75	96·45	89·00	97·50	87·80	96·30	89·00	96·20	89·25	96·15	89 00	97·75
Digitalis	88·00	96·00	88·75	97·75	86·00	95·00	87·50	95·50	88·50	95·50	88·00	97·00
Hyoscyamus	88·00	96·20	88·00	97·10	87·20	95·95	88·10	96·30	88 25	96·25	88·20	97·20
Senna Alex	88·20	96 00	88 25	96·65	86·80	94·40	89·00	96·80	89·00	96·25	89 75	97·95
Uva ursi	89·67	97·07	89·00	97·90	88·80	97·00	89·25	96 85	89·20	96·60	89·60	98·35
4. *Flowers.*												
Anthemis	90 00	97·10	89·00	97·65	88·40	96·80	89·25	96·95	89·80	97·10	89·75	97·85
Arnica	89·75	97·25	89·20	97·30	88·70	96·37	89·00	96·50	90·00	97·50	89·75	97·70
5. *Seeds.*												
Colchicum	89·75	97·75	90·00	98·00	88·20	96·20	88·80	96·20	89·00	96·25	89·20	97·30
Stramonium	91.40	98·40	90·00	97·00	89·80	96·70	89·90	96·45	90·00	96·00	90·00	98·00

DRUGS.	July.		August.		September.		October.		November.		December.	
	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.
	Dry.	Very wet.	Wet.	Wet.	Dry.	Dry.	Damp	Wet.	Dry.	Dry.	Dry.	Wet.
1. *Roots and Rhizomes*												
Colchicum	88·80	98 80	87·70	98 25	88·20	97·20	88·00	97·75	88·25	96·35	88·70	98 30
Gentiana	89 20	98 00	87·90	97·50	89·20	98 00	88·25	99·45	89 60	97 45	89·60	98·00
Lappa	88 20	98·20	87 00	98·00	88·35	97·15	87·80	97·90	88·25	95·85	88 80	98·45
Podophyllum	88·10	97·70	87·25	98·00	88·75	97·65	88·15	97·50	88·75	96·25	88·90	98·00
Rheum	89·60	98·30	87·20	96 95	88·75	96·75	88·20	97·70	89·10	97·00	89·75	98·75
Senega	89·25	98·65	88·20	98·40	88·90	97·30	88·20	97·60	88·90	96·20	89·10	98·60
Serpentaria	88 80	97·90	86·75	97·00	88·20	96·45	88·00	97·10	88·75	96·65	88·85	98·60
Taraxacum	86·90	96·90	84·40	95·90	86 50	95·60	84·75	93·75	87·10	95·50	86 80	97 90
Valeriana	89 00	97·65	87·80	97·80	88·50	96·70	88·10	97·60	89 00	97 05	88·90	98·40
2. *Barks.*												
Cinchona rubra	89 75	97·60	87 80	96·90	88·90	96·70	88·50	97·25	89 00	94·40	89·20	97·20
Cinnamomum	88 80	97·55	88·25	98·00	89·00	97·20	87·90	97·90	88·80	96·40	88·90	98·70
Prunus Virgin.	89·25	97·25	89·00	98·70	89·50	97·90	88·00	97 25	89·00	96·50	89·15	98·65
Sassafras	88·90	97·50	87·90	98·00	88·80	96 95	87·75	97·35	88 90	96·00	89 00	98 15
3. *Leaves.*												
Aconitum	88·20	98·20	87·00	97·75	88·10	97·30	87·50	97·50	88 00	96·15	88·50	98 50
Belladonna	88·75	98 55	86 25	96·75	88·75	97·80	87·20	97·70	87·90	96·15	88·40	98 60
Buchu	89·30	98·20	87 90	97·40	88 90	97·65	88·10	97·00	89·00	97 0(	89 00	98·70
Digitalis	88·25	97·75	86·75	97·75	88·00	97·00	87·00	97·20	88 00	96·10	89·00	98·50
Hyoscyamus	88·25	98·00	87·00	97 25	88·00	96·90	87·60	97·20	88·00	96·25	88·20	98·00
Senna Alex	90·00	98·00	87 00	97·20	89·00	96·85	88·20	97·20	88·40	96·30	89·00	98·75
Uva ursi	89·60	98·10	88·00	97·20	89·10	97·35	88·50	97·00	88·75	96·15	88·80	97 20
4. *Flowers.*												
Anthemis	89·67	97 67	88·75	97.75	89·75	97·65	89·00	97·25	89·00	96·20	89·25	98·25
Arnica	89·40	98·15	88·65	97·75	89·35	96·50	88·50	97 70	88·90	96 40	89·40	98·50
5. *Seeds.*												
Colchicum	89·90	98·00	88 50	97·00	89·50	97·60	88·80	96·90	89·50	96·65	90·00	98·20
Stramonium	89 80	98·20	89·65	97·40	90·00	98 00	89·60	97·80	90 10	97 20	90·20	98·20

EXTEMPORANEOUS PHARMACY.

By Willard M. Rice, Jr.

It is my purpose, in this article, to speak of the great importance to pharmacists of a thorough knowledge of this branch of our profession, and also to mention some of the abuses into which it has fallen. If, as a result of my labors, any one, student or preceptor, shall be induced to pay greater attention to this subject, I shall be amply repaid.

One would suppose, if he were unacquainted with the facts of the case, that *this* branch of our profession, at least, would be thoroughly mastered by every one engaged in the dispensing and compounding of drugs and medicines. But if such a person were to take the

trouble to inquire into the matter, what a lamentable state of affairs would be brought to light! I do not wish to be understood as depreciating or underrating the standard of knowledge and ability possessed by our druggists as a class,—far from it—but it is a fact well known to every thoughtful mind, that there are a great many persons in the ranks of our profession who are terribly deficient in this most important branch. And this is the more inexcusable when Colleges and Text books are so plenty and good, offering to all who choose to avail themselves of their privileges the advantages of a good sound pharmaceutical education.

Nor are druggists the only ones to blame in this matter. The prescription files of any of our retail drug stores will show orders, some of them written by men standing high in their profession—bright and shining lights of the medical firmament—calling for the administration of drugs not only *chemically*, but often *pharmaceutically* incompatible. But it is to the case of the druggist that I wish to call attention more particularly at this time. It oftentimes happens that the exhibition of two or more articles in combination depends mainly, and even entirely, for its success upon the skilful manner in which the prescription is compounded. In such a case how important it is to know just "what to do," and "how to do it!" The health, and oftentimes the life itself of the patient may be in our hands, and woe be unto us if we prove recreant to the great trust reposed in us! What a cause of poignant grief and self-recrimination it would be to know that our criminal neglect of the means of knowledge within our reach has been the means of hurrying some soul, perhaps unprepared, into the presence of its maker and its judge.

But it falls to our lot not only to compound and dispense correctly and knowingly, but it is also laid upon us to correct the oftrepeated mistakes of prescribers. This is a matter of much delicacy, and requiring a great deal of individual *tact*, as no set of rules can be laid down to guide us in these cases. We are sometimes startled by having handed to us a prescription calling for a large quantity of some poisonous alkaloid, for example, and unaccompanied by any directions for use, (a neglect, by the way, of what is evidently *right* and *duty* in most cases at least, that is strangely prevalent at present). In this case we are compelled either by adroit questioning to get some idea of the manner in which the medicine is

to be used from the person bringing the prescription, without at the same time exciting his or her suspicions on the subject, or else, pleading necessary delay, we have to consult the physician himself. In this latter case how often are we treated as if it were a criminal act to be careful and particular in dispensing deadly articles.

Again, a prescription may be handed to us with the remark, "please hurry, as the doctor is waiting to administer the first dose himself." Upon looking at the manuscript we find that it has evidently been hastily scrawled with lead pencil, probably at the bedside of the patient, and only by much study, and some "guesswork," are we able to make it out. I venture to say that all of my professional brethren have gone through this experience.

But examples such as these might be multiplied to an almost indefinite extent—let these suffice. It remains for us to consider the remedy or remedies for this state of affairs. This I leave to older and more experienced heads than mine, only hoping that my humble endeavor may have the effect of calling attention to the great need of practical instruction in extemporaneous pharmacy in our pharmaceutical schools and colleges, and also in the store. There are some proprietors who insist on making all their preparations *themselves*, and even boast of so doing, thus giving their students no means of acquiring *practically* a knowledge of the daily routine of the laboratory. How these parties can expect to train up thorough pharmacists is more than the writer of this can understand.

Nor is this all that is needed. Who doubts that if a course of practical pharmacy formed a part of the curriculum of our medical schools there would be fewer deaths from "mistakes" to record.

And may we all, physicians and druggists, remember that we shall be called upon hereafter to account for "the deeds done in the body," and may we realize that it is our bounden duty to make the most of our advantages, and to acquire as thorough a knowledge as possible of our avocations.

Philadelphia, March, 1874.

DISINFECTANTS, ANTISEPTICS AND DEODORIZERS.

By Adolph W. Miller, M. D., Ph. D.

Read at the Pharmaceutical Meeting March 17th.

The above terms appear to be regarded by many as being almost synonymous in their meaning, and consequently they are freely in-

terchanged. Inasmuch as each of them indicates a different action and applies to a special class of substances, it may further scientific accuracy to define the peculiar signification of these words with greater precision.

A deodorizer, deodorant or antibromic is evidently a body which has the property of destroying offensive odors, whether it be by chemical action or by merely absorbing fetid gases.

An antiseptic is a body which prevents or checks putrefaction.

The word disinfectant, the most popular term of the three, applies literally only to those agents which are capable of neutralizing morbific effluvia. Dr. Henry Hartshorne tersely defines that substance to be a disinfectant, which destroys either a noxious material itself, or the pabulum upon which it subsists. As it is, however, still an open question, whether we possess any chemicals which have the power of destroying disease germs, at least in that state of dilution in which it is practicable to employ them, the term disinfectant is frequently used in a somewhat more liberal sense. Thus, Dunglison includes under it also antiseptics, or agents that are capable of removing any incipient or fully formed septic condition of the living body. We regret to observe that even in the revised and recently published edition of this standard work, no alteration has been made in this definition, which we conceive to embrace entirely too much latitude of meaning.

Dr. Squibb has proposed the new word *azymotic*, contracted from the French *antizymotique*, in order to express the peculiar effect of carbolic and cresylic acids on those low organic forms, whose life is intimately connected with fermentation. The difference in meaning between azymotic and antiseptic is clearly shown by their etymology —the one expressing the absence of fermentation, the other the prevention of putrefaction. The new term seems to be a fortunate one, although it would have been better not to have altered the prefix of the French word, since in its present form it indicates only negation, while *anti* distinctly defines opposition. We may note, in passing, that the flexibility and abundant resources of the German language have been amply sufficient to express the precise meaning of antizymotic by the term *gährungswidrig*, without the necessity of borrowing from a foreign idiom.

Charcoal and dry earth may be given as examples of simple deodorizers; they are disinfectants only in so far that they prevent the

escape of morbid particles when they mechanically enclose them. They have neither antiseptic nor azymotic properties, since, according to Crace Calvert's experiments, charcoal positively favors putrefaction and the production of vibriones.

Glycerin and chloride of sodium may be considered as antiseptics, both being practically used for preserving meat and other animal substances. Neither of them possess a notable influence on the production or destruction of disease germs, so that they are not true disinfectants—at least not in the restricted signification of the word—nor can either of them be ranked as a deodorizer.

Cresylic and carbolic acids may possess disinfectant, antiseptic and azymotic properties to an eminent degree; but they are certainly not deodorizers, though they frequently disguise or mask an unpleasant odor by their own inherent abominable stench.

Superheated steam, or an elevated dry temperature, is perhaps the most reliable disinfectant that we possess. Both are also azymotic, as they destroy the vitality of the organic forms on which fermentation depends; but they have only a very slight antiseptic effect, unless the amount of moisture, which is requisite for putrefaction, is withdrawn from the tissues by continued exsiccation. Neither dry nor moist heat can be regarded as deodorizers, as they have no influence towards fixing or decomposing offensive gases.

We see thus that the bodies, which are usually collectively called disinfectants, may possess but a single one of the four qualities enumerated above; more frequently they have two of them and sometimes three, but rarely, if ever, the entire four.

A highly interesting series of experiments, made by F. Crace Calvert, tends to elucidate this point still more clearly. As his valuable papers have a direct bearing on this subject, it may prove profitable to present a condensed abstract of them.

The experiments were conducted in small glass tubes, which had been carefully cleaned and heated to redness. 26 grams of a mixture, consisting of 4 parts of water to 1 of egg albumen, were introduced into each of them. 26 milligrams of the substances experimented with were subsequently added, being equivalent to 0·001. Immediately after the mixing a drop of the liquid was examined under a microscope with a power of 800 diameters; this was repeated daily for the succeeding 39 days, and occasionally for the following 80 days.

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The results arrived at may be summarized as follows: Only carbolic and cresylic acids prevented the formation of both mould and vibriones. The chlorides of zinc and mercury, and sulpho-carbolate of zinc, prevented the generation of protoplasmic life, but not of mould. Lime, sulphate of quinia, pepper and hydrocyanic acid admitted of the production of vibriones, but not of mould. A fourth class of bodies had no antagonistic effect on either of them, comprising sulphurous, sulphuric, nitric, arsenious and acetic acids, caustic soda, potassa and ammonia, the chlorides of sodium, calcium and aluminium, hypochlorite of calcium, chlorate of potassium, the sulphates of calcium and iron, bisulphate of calcium, hyposulphite of calcium, the phosphates of sodium and calcium, permanganate of potassium, the sulpho-carbolates of potassium and sodium, picric acid, turpentine and charcoal.

Hypochlorite of calcium acted as an antiseptic only when used in large excess, by decomposing organic compounds with the evolution of nitrogen. The assumption that chlorinated lime renders organic substances incapable of putrefaction, is consequently fallacious. On the contrary, when used in small proportion, like other agents which favor oxidation, it actually promotes decay and the generation of infusorial life; but when about four per cent is added, it checks the development of animalcules in organic solutions, and also destroys the vitality of vaccine lymph.

Special attention is also called to the action of the sulphate of quinia, which, while not interfering with vibrio life, completely arrests the growth of fungi. As quinia is as near a specific for intermittent fever as any that we possess, it seems probable that this disease is caused by the introduction of the germs of low vegetable forms into the system. The prevalence of intermittent fever in marshy districts, contrasted with its rarity in high and dry regions, seems to be another argument to strengthen this theory.

In a second series of experiments, Dr. Crace Calvert employed solutions of albumen in which organisms had already been formed, to which he added one per cent. of the various substances. Cresylic acid completely destroyed the vibriones and prevented their reappearance during the entire continuation of the trial. Carbolic acid, sulphate of quinia, chloride of zinc and sulphuric acid killed almost all the vibriones, though a few were observed towards the end of the experiment. Sulpho carbolate of zinc and picric acid were likewise fatal to almost

all the vibriones, but did not seem to interfere with their reproduction, although after sixteen days the solution contained only about half as many as a simple one, which had been reserved for comparison. Chloride of aluminium, sulphurous and hydrocyanic acids behaved in the same manner, but after sixteen days the solutions contained quite as many vibriones as the simple trial mixture. Hypochlorite of calcium, chloride of mercury, chlorine water, caustic soda, acetic acid, nitric acid, sulphate of iron and sulpho-carbolate of sodium at first destroyed a large proportion of the vibriones, but afterwards seemed to favor their regeneration to such an extent that these solutions finally contained more vibriones than the trial mixture. Arsenious acid, the chlorides of sodium, calcium and potassium, sulphate of calcium, turpentine and pepper exerted no effect on these organisms, neither at the beginning nor after the sixteen days, during which the studies were prosecuted. Lime, charcoal, permanganate of potassium, phosphate of sodium and caustic ammonia favored the production of both vibriones and moulds.

We may next examine the peculiar manner in which disinfectants accomplish their results. We find that their different modes of action may be grouped together under five different classes, as described in the following table, which has been compiled by Dr. Henry Hartshorne:—

1st. By the absorption of gases and by preventing their emanations, as dry earth, lime and charcoal.

2d. By neutralizing and fixing sulph-hydric acid, as nitrate of lead.

3d. By antiseptic action, that is, by arresting putrefactive changes in organic matter, as sulphurous acid.

4th. By decomposing sulph-hydric acid and organic matter, as chlorine.

5th. By destroying organic disease germs or morbid poisons of infection and contagion.

Substances possessing the properties of the first two classes should be called deodorizers, while those embraced in the fifth class have a just claim to be considered as disinfectants. The agents included in the fourth class act as deodorizers, but may also become true disinfectants if used in sufficiently large proportion.

It seems to be a curious fact that the oxidation of perfumes and volatile oils is generally accompanied by an active ozonization of the atmosphere. Prof. Paolo Mantegazza, of Pavia, who has carefully

investigated this subject, says that it is a very convenient method of obtaining ozone, as, under the influence of solar light, the essential oils will ozonize comparatively large proportions of atmospheric oxygen. This statement seems to furnish a true basis for the reputation which odorous herbs and other perfumes have borne as purifiers of the atmosphere since ancient times. The fumigation with aromatic gums, which are so liberally indulged in by the Latin church, may therefore have a sanitary value in addition to the gratification of the olfactory sense by the diffusion of their rich-smelling odor throughout the edifice. Dr. Dougall found benzoic acid, which is so large a constituent of these gums, to be a more powerful antiseptic than any other organic acid.

The confusion of terms relating to this subject is not by any means confined to this country. Thus we find in the German periodicals an article on chlorinated lime as a disinfectant, by A. Eckstein, an apothecary of Vienna. The only test which he applied for the purpose of ascertaining the *disinfecting* properties of chlorinated lime and other chemicals, was the impression produced upon his own olfactory organs. The paper has consequently a practical, if not a scientific value, as we are all personally interested in the abatement of nuisances and the removal of nauseous effluvia to which we are compelled to expose ourselves daily.

Eckstein states that the results of his experiments have convinced him that chlorinated lime is the most useful agent for deodorizing cesspools, privy wells and excrementitious matter in general. The rapidity and energy of its decomposition has so far proved to be an obstacle to its regular employment, as the eliminated chlorine vapors seriously incommode the respiratory organs of those who frequent the localities where it has been applied. In order to overcome this objection, Eckstein conceived the idea of employing a cover of a material which is but slowly acted on by lime, but which, by its osmotic qualities, mitigates the inhalation of chlorine vapors to such an extent that they do not annoy the respiration of even the most sensitive. He found a bag made of parchment paper to fulfil these indications in the most convenient manner. When such a bag is thrown into a well it remains in the spot where it has been deposited, as it is too heavy to be washed away by the drainings. As it is constantly surrounded by liquids, it has a local action, which seems to consume the chlorine in about the same ratio in which it escapes.

Eckstein experimented for two years with the privy of his house in Vienna, which was frequented by at least one hundred persons daily. He successively tried a great number of chemicals in various methods, with the following results:

1st. When an aqueous solution of two pounds of iron sulphate was poured into the well, the odor of sulph-hydric acid was eliminated for several hours. After this time all unpleasant odor had disappeared, but within twelve hours the effect of the deodorizer was no longer perceptible.

2d. A solution of sulphate of copper behaved in the same manner.

3d. Two pounds of iron sulphate in crystals exerted a deodorizing effect for two entire days; the same amount of copper sulphate in crystals gave analogous results.

4th. Two pounds of disinfecting powder, composed of a mixture of iron and copper sulphates with carbolated lime, acted for only two days.

5th. Sulphurous acid, in a liquid form, was found to be rapidly effective, but it proved to be very troublesome to the organs of respiration for an hour, and it was dissipated within twenty-four hours.

6th. One ounce of red carbolic acid disseminated a very unpleasant tarry odor throughout the entire house for two days; so that its true effects could not be estimated, as one fetid odor was concealed by a still worse one.

7th. Two pounds of iron sulphate in crystals were introduced into a parchment bag and put into the cesspool. No result was observed until after two hours, and but little sulph-hydric acid was eliminated. The place was thoroughly deodorized for three full days. When the parchment bag was removed it contained only a turbid, but almost inodorous, liquid.

8th. Two pounds of commercial chlorinated lime, of high test, enclosed in a parchment bag, began to deodorize within two hours after being deposited. It did not in any manner inconvenience either the respiratory or the olfactory organs, while its action extended over a period of quite nine days.

9th. Two ounces of crude permanganate of sodium, used by itself in solution, deodorized almost instantly, but all traces of its effects had vanished after twenty-four hours. The same preparation, when enclosed in a parchment bag, was active for two days.

The above data seem to demonstrate conclusively that chlorinated

lime, enclosed in a bag of parchment paper, deodorizes not only in the most effectual manner, but also for the longest period of time. This statement is confirmed by the results of numerous similar investigations which have been recently instituted in the Official Chemical Laboratory for Public Hygiene of Dresden, in Germany. Many of the so-called disinfectants were carefully studied in relation to their effects in deodorizing the liquid of manure heaps. Chlorinated lime, in conjunction with sulphuric acid, was found to be the most powerful, so that the value of this was taken as the standard, being numerically expressed by 100. The results were tabulated as follows:

Chlorinated lime with sulphuric acid,	= 100
Two parts chlorinated lime with seven parts iron sulphate,	= 99
Calcium sulphate with seven parts iron sulphate,	= 92
Carbolic disinfecting powder,	= 85·6
Slacked lime,	= 84·6
Alum,	= 80·4
Iron sulphate,	= 76·7
Chloralum,	= 74
Magnesium sulphate,	= 57·1
Potassium permanganate with sulphuric acid,	= 51·3

The report takes special occasion to caution the public against the purchase of the English chloralum preparations, on account of the disproportion existing between their actual value and the price demanded for them. According to the analyses of Alex. Müller chloralum consists of 16 aluminium chloride, 1·7 calcium chloride, 0·1 alkaline sulphates, 1·2 hydrochloric acid and 80·9 water. Chloralum powder contained 13·4 of aluminium chloride, 4·1 of aluminium sulphate, 9·1 calcium sulphate, 14·1 sodium sulphate, 15·5 of alumina soluble in hydrochloric acid, 13·5 kaolin, 9·4 silicic acid and 20·9 water. Müller considers it probable that both articles are obtained as by-products in the manufacture of soda.

ON THE RECTIFICATION OF ALCOHOL BY MEANS OF LIME.

By Charles Bullock.

The process usually employed to obtain absolute alcohol, is distillation of the spirit from quick lime.

The practical result of the process will appear from the following operation.

Fifteen gallons of alcohol, sp. gr. ·82361 at 60° F. = 93 per cent. was poured upon seventy pounds of well-burned lime, (previously broken into small pieces), in a still, heated by a steam jacket. The still was then made tight, and heated to about 120°; after standing three days, a worm was attached and distillation commenced, protecting the distillate from the air. Each gallon was collected in a separate vessel, the heat being gradually increased as was necessary to cause the alcohol to pass over slowly.

Ten gallons was all that could be made to pass over by steam heat. Water was then added to the lime in the still, and most of the alcohol recovered as dilute alcohol.

The ten gallons of strong alcohol thus obtained was returned to a still with twenty-five pounds of quick lime, and the operation as above repeated. Eight gallons of alcohol was obtained, separated as before in fractional portions of one gallon.

The specific gravity of the several portions taken on a balance with the one thousand grain bottle, temperature at 60° F. is shown in the following summary:

Gallon.	First Distillation.	Second Distillation.
1st.	·80170	·80978
2nd.	·79756	·79700
3rd.	·79610	·79461
4th.	·79762	·79516
5th.	·80040	·79458
6th.	·79593	·79410
7th.	·79782	·79425
8th.	·79632	·79615
9th.	·79706	
10th.	·79780	
Mean	·79783	·79695

The density of absolute alcohol varies somewhat with different authorities; Drinkwater and Fowne give ·79381, Tralles, ·7939, and Gay-Lussac, ·7947; taking the mean of these authorities, we have ·79413.

It will be seen, on reference to the figures given above, that the sixth gallon of the second distillation alone is absolute, according to this mean standard, and that the mean of the 3rd, 4th, 5th, 6th, and 7th gallon of the second distillation is ·79425, being within the figures given by Gay-Lussac.

It will be noticed that the weakest alcohol distills over first, which would lead to the supposition of an affinity of the lime for the stronger portion of alcohol, or else water having a greater disposition to vaporize in an atmosphere of alcohol vapor.

The distillates all contain lime, which does not separate on standing, the stronger the alcohol the greater appears to be the amount of lime present. Redistillation from overdry tartaric acid removes the lime, (Gmelin,) and renders the alcohol perfectly clear.

—*Philadelphia, March*, 1874.

NOTES ON PTYALIN.

By Albert P. Brown, G. P.

At the pharmaceutical meeting held in January I stated that at the suggestion of my friend Dr. Marcy I had experimented with the parotid gland of the pig in order, if possible, to obtain ptyalin. Ptyalin is found in the saliva, and acts on starch, rapidly changing it into glucose. The parotid gland is the "salivatory gland, situated nearest the ear, which pours its secretion into the mouth during mastication. It is largest in the herbivora, and those animals whose food is most difficult of mastication. Its duct, called the duct of Steno, opens into the mouth opposite the second molar tooth.

The parotids were obtained from the butcher immediately after killing, chopped fine, macerated in water acidulated with hydrochloric acid for twenty four hours, and then separated by filtration. To the acidulated solution a saturated solution of sodium chloride was added, which caused a precipitate; this was allowed to stand until the precipitate rose to the surface; it was then skimmed off and placed on a muslin filter to drain, afterwards washed with a weak solution of sodium chloride, and then pressed. When all the salt solution had been removed and the mass was nearly dry, it was rubbed with a quantity of milk sugar and then thoroughly dried without heat, after which it was diluted with sugar of milk until five grains dissolved in one fluidrachm of water would emulsify to fluidrachms of cod liver oil; in other words, it is prepared in the same manner that pepsin and pancreatin are. Ptyalin is most beneficially employed in combination with pepsin and pancreatin, as a promoter of digestion. The hurried manner in which nearly all Americans masticate their food interferes with the very first condition to healthy digestion. I have seen some severe

cases of dyspepsia relieved with a few doses of the above combination. An elixir can be prepared from ptyalin in the same manner as elixir of pepsin and elixir of pancreatin; and when equal proportions of the three elixirs are mixed together and given in dessertspoonful doses, immediately before eating. the happiest results are obtained.

Ptyalin is a substance of the nature of diastase, both having the power of converting starchy food into soluble glucose. Diastase acts like pancreatin and ptyalin when mixed with cod liver oil. If a strong infusion of malt is mixed with cod liver oil, an emulsion is formed equal to the one produced when pancreatin or ptyalin is used.

In order to test the virtue of ptyalin, its action on starch and albumen was tried with the following results:

About a drachm of arrow root was mixed with a small quantity of water, about a quarter of a grain of ptyalin, freshly precipitated and without any sugar of milk being added to it, was added to the starch and water, and kept at a temperature of 100° Fahr. for twenty-four hours. At the expiration of that time the mixture was filtered and the filtrate tested for glucose by Trommer's test, which gave the characteristics of that test, reducing the cupric solution.

The action on albumen was next tried; ten grains of saccharated ptyalin was dissolved in one fluid-ounce of water, and ten drops of hydrochloric acid and one hundred and twenty grains of coagulated albumen were added; the mixture was kept at a temperature of 100° Fahr. for twelve hours, then filtered and the remaining albumen weighed. It was found that the ptyalin had dissolved about twenty grains, thus showing its inferiority to pepsin.

When I first made ptyalin I considered it only a curiosity, and kept it to show as such, but physicians became interested in it and began to prescribe it. There must certainly be some virtue in it. I first made one ounce, and the demand was so great that I had to make a larger quantity, which was soon exhausted, and another still larger lot was made, and the demand is still increasing.

I do not suggest ptyalin as a substitute for pancreatin, but to be used in combination with pancreatin and pepsin, as a promoter of digestion; and the three combined I think are better than either of them used singly.

Camden, N. J., March 16th, 1874.

ON THE PREPARATION OF MEDICATED WATERS.

By James Ruan, G. P.

I desire to present to the consideration of the readers of the Journal the following suggestion for the preparation of the different medicated waters of the U. S. Pharmacopœia which call for the intervention of magnesium carbonate in their preparation; the substance which I suggest to take the place of the latter, is paper pulp, prepared from chemically pure filtering paper.

The following is the "modus operandi" which I find yields very satisfactory results:

To prepare Aqua Menthæ Piperitæ—

Take of the Oil of Peppermint half a fluidrachm.
Chemically pure filtering paper one drachm.
Distilled water, two pints.

The paper is cut into small pieces and beaten up in a mortar with one ounce of water gradually added until reduced to a pulpy consistence; the oil is then added and triturated with the pulp until incorporated; fifteen ounces more of water is to be gradually added; the whole is then poured into a suitable sized bottle, the mortar rinsed out with the remaining pint of water, which is added to the first. The whole is then to be well shaken and then filtered through paper.

In the same manner prepare other aquæ medicatæ, which call for the intervention of magnesium carbonate. Peppermint water, prepared as above, is strongly impregnated with the oil, and beautifully transparent; some which I had prepared over three weeks, is still clear, with no appearance of sediment or separation of the oil.

Aqua Cinnamomi, prepared by the above process, is perfectly colorless, with the odor and taste strongly defined.

In the preparation of the waters by the above process, it is well to allow them to stand a few hours before filtration, occasionally shaking so as to thoroughly disseminate the pulp through the water, thereby giving the water greater surface to act on. I think the waters prepared according to the described manner equal to the distilled. The filters can be reserved for making additional pulp. I am not aware that the process I have described has been used before, and as the results I have found so satisfactory in my case, I thought I would present the process to the Journal for publication.

I have prepared Aqua Camphoræ by the same process, first reduc-

ing the camphor to fine powder by alcohol, and proceeding as with the others.

Philadelphia, March 19, 1874.

PRELIMINARY NOTICE ON THE OILS OF WORMWOOD AND CITRONELLA.

By C. R. A. Wright, D.Sc.

A quantity of pure oil of wormwood (obtained from Dr. Septimus Piesse) being submitted to distillation, the greater part passed over at a temperature close upon 200° C., a portion of blue oily product being obtained at a higher temperature (the *azulene* of Piesse and *cærulëin* of Gladstone), and also a small quantity of substance boiling below 190°, and apparently containing a terpene.

The portion boiling at 200°—205° has been shown by Leblanc to be indicated by the formula $C_{10}H_{16}O$, whence Gladstone has termed the substance *absinthol*. It hence appears that this substance is isomeric with the myristicol found to exist in nutmeg oil and in camphor; and as each of these bodies breaks up into water and cymene when treated with dehydrating agents (*e. g.*, zinc chloride, phoshorus sulphide, etc.,) the action of these bodies on absinthol was examined.

When absinthol was heated with phosphorus pentasulphide, a moderately energetic action was perceived, and a colorless liquid distilled over; this was poured back into the retort when the action had ceased, and the whole kept very gently boiling for half an hour. On distillation, a quantity of hydrocarbon passed over at 170°—180°. The thermometer then rose rapidly, and a yellowish liquid distilled at 230° and upwards, the sum of two distillates representing about 35 or 40 per cent. of the absinthol used, and the first being about half as much again as the second.

The hydrocarbon was found to boil at close upon 176° after treatment with sulphuric acid and distillation over sodium. On analysis it appeared to be *cymene*, formed by the reaction

$$C_{10}H_{16}O = H_2O + C_{10}H_{14}.$$

The oxidation-products of this cymene are now undergoing investigation, in order to decide whether this hydrocarbon is identical with the cymene now known to be obtainable from many other sources.

Zinc chloride seems to act similarly, water, cymene and a resinous body being formed.

The liquid of higher boiling point appears to consist mainly of *thiocymene* or *cymyl-sulphydrate*, apparently identical with that recently obtained by Flesch from the products of the action of phosphorus sulphide on camphor. The boiling point of the pure substance lies close to 235°, and it corresponds in all respects with thiocymene described by Flesch, especially in the production of a mercury salt crystallizable from hot alcohol, and a silver salt only slightly soluble in hot alcohol. The properties of this body are undergoing further examination.

The reason for publishing this notice is the appearance of a paper by Beilstein and Kupffer (*Deut. Chem. Ges. Ber.*, vi, 1183) a few days ago, wherein the authors state that by the action of phosphorus sulphide on absinthol, cymene results, from which a sulpho acid can be prepared, giving salts identical with those similarly obtained from the cymene of cumin oil and that of camphor.

When oil of citronella is distilled, the main constituent seems to be an unstable body of formula $C_{10}H_{18}O$ (Gladstone found $C_{10}H_{16}O$. Not improbably essential oils vary in composition according to the climate, soil, etc.) The action of dehydrating agents on this oil seems to give rise, not to cymene, but to a terpene. By careful addition of two proportions of bromine, a product is obtained which on heating splits up thus:—

$$C_{10}H_{18}Br_2O = H_2O + 2HBr + C_{10}H_{14},$$

the resulting cymene being apparently identical with that already known.

It is proposed also to examine the oil of cajeput, borneol, and other substances of formula $C_{10}H_{18}O$ in the same way.—*Journ. of the Chem. Society, London, January*, 1874.

Varieties.

Action of Aërated Water on Lead.—M. Fordos —The danger arising from the employment of leaden pipes has been much exaggerated, and is certainly far smaller than that resulting from the use of shot in cleaning out bottles. The author, having shaken up shot in bottles in the ordinary way, filled four of them respectively with white wine, red wine, quinine wine, and vinegar. After allowing the liquids to stand for a few days, he discovered lead in solution. These experiments may serve, he adds, to explain the frequent presence of lead in the human system, a phenomenon so general that Hervy, Devergie and Orfila have considered it a normal constitnent.—*Chemical News, Jan.* 30, 1873, *from Bulletin de la Société Chimique de Paris*, tome xx, No. 11, *Dec.* 5, 1873.

Action of the Waters of the Seine and Ourcq upon Lead.—M. Fordos.—The author finds that the waters of the Seine and Ourcq attack lead, though more slowly than distilled water. The action is more rapid the more finely divided the metal. New lead is less rapidly attacked than old. The product of the action of these waters consists of carbonate of lime and carbonate of lead, and these waters, after this reaction, contain no lead in solution, or merely an infinitesimal quantity.—*Ibid.*

Poisoning by Cantharidal Collodion.—Dr. Ernst Schwerin, of Berlin, reports a case (*Berliner Klinische Wochenschrift*) of poisoning with cantharidal collodion. The patient, a woman aged twenty-three years, swallowed, through mistake, fifteen drops of the preparation. After about an hour had elapsed she was attacked with cramps in the lower part of the abdomen, for which, previously to sending for a physician, numerous household remedies were used. The doctor upon his arrival found the patient running about the room, with the arms crossed upon the abdomen, stopping after every few steps to void a few drops of urine, the passage of which was attended with intense pain. At times she fell into a species of catalepsy. The pulse was small and of moderate frequency. For some days albumen was found in the urine. Under treatment, she at the end of a few days was entirely recovered. It is interesting to notice that the sexual passion was not at all excited by the drug; and this goes to confirm the opinion of later observers, that the older physicians were mistaken in attributing aphrodisiac qualities to it.

Medical Times, Feb. 14, 1874. Wm. Ashbridge, M. D.

Croton Chloral Hydrate (*The Lancet*, January 31, 1874.)—Mr. J. Burney Yeo, after a number of systematic observations, has come to the following conclusions:

1. In croton chloral hydrate we possess a remedy of remarkable efficacy in some cases of neuralgia of the branches of the nervus trigeminus. 2. It has also the power of affording relief in other obstinate forms of neuralgia. 3. It is of use in certain cases of diffused muscular rheumatism. 4. It has but little effect in purely rheumatic cases. 5. In cases of localized pain and other nervous symptoms which we find in the class of persons we are in the habit of calling hysterical, this drug is of little or no use. 6. Its efficacy in procuring sleep seems very variable in moderate doses. Two grains will produce sleep in some sensitive females, while ten grains will not even cause drowsiness in non-sensitive males. 7. It is very valuable in some forms of irritative and spasmodic cough, and there is scarcely any remedy likely to prove more valuable for the relief of the distressing night-cough of chronic phthisis.

The dose varies from one to ten grains. From two to five grains may be given every hour, or the smaller dose every half hour, until fifteen grains have been taken. At present it hardly seems safe to go beyond that dose.

The subcutaneous injection of twelve grains in a cat produced, after long unconsciousness, a series of epileptic convulsions and death.—*Philada. Medical Times*, March 21, 1874.

Minutes of the Pharmaceutical Meeting.

The regular monthly meeting was held March 17th, 1874; fourteen members present.

Dillwyn Parrish was requested to occupy the chair, and the minutes of the last meeting being called for, they were read and approved.

Under the head of donations to the Library, which was first in the order of business, Mr. T. H. Hazard presented to the College Library a valuable collection of engraved plates of various plants. They were bound in three large volumes, and the title page bore the name Herbier Artificiel; the number of plates contained in this work was nearly a thousand. The thanks of the College were presented to Mr. Hazard for the acceptable gift.

Professor Maisch presented on behalf of the patentee, Mr. Jas. H. Plaisted, of Waterville, Maine, a suppository mould, for which the inventor claims merit. The mould is in two pieces, held in their places by a rubber band; they are prevented from slipping horizontally by a very simple arrangement, which, however, permits them to slide in a plane parallel to the axes of the suppositories; on this point the inventor claims superiority, for he argues that, when the suppository is cold enough, a slight sliding motion in the direction indicated, suffices to drop them out.

Joseph P. Remington presented a urethral suppository mould on behalf of W. S. Wellcome, a graduate of the last class, who had written his thesis on the subject; the cooling box was nicely made of zinc, which was an improvement on the tin ones usually employed.

A general discussion was entered into on the subject of suppository moulds, during which Edward Chiles spoke of a mould made by Maw & Sons, which was somewhat similar to Plaisted's, and which he was much pleased with; the horizontal slipping movement was controlled by a pin at the end, which fitted in a corresponding depression in the other mould.

Professor Maisch exhibited a sample of what was said to be wild cherry bark, but which on examination proved to be very largely adulterated; it seemed to be principally composed of the bark of the sassafras trunk. He also showed a sample of Vanilla pampona from Laguayra, and two beans, the origin of which was not exactly known; they were very much broader than the regular bean, and although possessed of a number of the characteristics of the true bean, did not possess the delightful odor of the genuine. Dr. A. W. Miller said that they had been offered for sale in the city at much less than the cost of the genuine, and the statement was made that they were the product of the wild plant.

Mr. T. H. Hazard presented two specimens as contributions to the cabinet; one, the seed vessel of Trappa Bicornis (ox-head), the other from a species of Martynia.

The reading of papers being now in order, Dr. A. W. Miller read one on "Disinfectants, Antiseptics, and Deodorizers," which was referred to the Publication Committee.

Joseph P. Remington exhibited a new form of condenser, in which the principal of Liebig's was retained, but instead of one central tube there were seven, arranged parallel to each other and drawn together at the end so as to deliver the distillate into a narrow-mouthed receptacle. By this arrangement the large amount of condensing surface which is desirable in the ordinary worm, is obtained, whilst the objection to the worm, the difficulty of cleaning, is obviated.

Dr. W. H. Pile showed a sample of phosphoretted resin which had changed color from exposure to sun-light; it had become a beautiful red; he also presented a sample of an emulsion made with phosphoretted resin, and a tube containing a mixture of alcohol and the resin showing that the phosphorus had separated in the form of a fine precipitate at the bottom.

No further business coming before the meeting, it then adjourned.

Jos P. Remington, *Registrar.*

Pharmaceutical Colleges and Associations.

Philadelphia College of Pharmacy.—The examinations for the degree and title of Graduate in Pharmacy were completed early in March, the following questions having been submitted to the candidates, and were required to be answered in writing:

Chemistry. rofessor Robert Bridges, M. D. Session 1873–74.

No. 1. State and explain the processes for preparing Corrosive Sublimate and Calomel; and give their physical and chemical properties, the impurities they may contain, and the methods, by which they may be detected.

No. 2. What is the natural source of Potassium Carbonate? Give the methods of obtaining the commercial and officinal varieties, the physical and chemical properties of the officinal forms, and the impurities contained in either.

No. 3. What is Aqua Regia and how is it made? State the physical and chemical changes which occur during its production, and the difference in chemical properties from those of the acids used in its formation.

No. 4. What is the substance commonly known by the name of Arsenic? Give the source and method by which it is obtained, its physical and chemical properties, its effects in overdoses on the system, and best antidotes.

No. 5. What is Chlorine? State and explain its mode of preparation, and the principal officinal compounds in whose production the gas is used.

No. 6. What are the officinal forms in which Calcium Carbonate is used as a medicine, and the methods by which they are prepared for medicinal use; and when by chemical means, give a formula of the reactions.

No. 7. What are the officinal preparations of Sulphur? State their mode of preparation and any impurity or adulteration they may contain.

No. 8. How is Iodide of Lead prepared? State the reasons for using the Lead Salt directed by the Pharmacopœia and any impurities which may arise from using other Salts of Lead.

No. 9. What are the antidotes for Corrosive Sublimate, and the Salts of Lead and Antimony?

No. 10. By what tests may the Magnesium, Zinc and Cadmium Salts be distinguished?

MATERIA MEDICA. Professor John M. Maisch. Session 1873–74.

1. Give the botanical characters of the natural order of Gentianaceæ; name the drugs derived from this order, and state their medicinal properties.
2. What is Rhubarb? Where, and from what plant is it obtained? Give its principal structural characteristics, and also the difference from European and American Rhubarb.
3. What part of May-Apple is used in medicine? Give the name of the plant, describe the officinal part, and give an outline of the process for the most important pharmaceutical preparation, as well as its yield and composition.
4. Give the name, natural order and habitat of the plant yielding Cascarilla. Describe the drug and give its important chemical constituents, its medicinal properties and dose.
5. Sabina.—Name, natural order and habitat of the plant. Describe the drug and its medicinal constituents; what are its properties, and how does it differ from a similar indigenous drug?
6. What is Kousso? Where, and from what plant is it obtained? Describe the drug and give its important constituents, medicinal properties and dose.
7. Describe Juniperberries as to origin, habitat and natural order of the plant, structure, composition and medicinal use.
8. Describe the structure of Mustard Seed. What is the difference between White and Black Mustard Seed in regard to origin (including natural order and habitat), appearance and composition?
9. What is Kamala? Give name, natural order and habitat of the plant, the structure of the drug, its composition, properties and test of purity.
10. Give the name, natural order and habitat of the plant yielding Camphor. How is crude Camphor obtained? What are its impurities? How is it purified? Give its chemical composition, and that of the Borneo Camphor.

QUESTIONS IN PHARMACY, for Professor William Procter, Jr., by Joseph P. Remington. Session 1873–74.

1. Define Specific Gravity. What instruments are employed in ascertaining the specific gravity of solids and liquids? How do you take the specific gravity of a substance lighter than water; and why is it necessary to fix upon one constant temperature in taking specific gravities?
2. What do the following terms mean, in a pharmaceutical sense: "Moderately Fine Powder," "Saturated Solution," "Flocculent Precipitate," "Conical Percolator." State, in a general way, how you would proceed in making a percolation of a drug,—Wild Cherry Bark, for an instance.
3. State the general characters of Acidum Carbolicum; including its specific gravity, solubilities, and boiling point. From what source is it obtained? What are its medical properties, and into what officinal preparations does it enter?
4. Give the officinal formula for making Spiritus Aetheris Nitrosi. Why are Copper Turnings used; and what is the nature of the residue left in the retort? Give the general characters and tests for strength, as given in the United States Pharmacopœia.
5. What is the general officinal process for obtaining volatile oils from plants? and what precautions are necessary in obtaining pure oils? Give the formula for Oil of Copaiba, and state why it requires special treatment.
6. Give the reasons for employing
   Ether, in making Tinctura Opii Deodorata, in U. S. P.,
   Crystallized Sulphate of Potassium, in Pulv. Ipecac. Comp.,

Muriatic Acid, in Ext. Conii Fruct. Fluidum,
Alcohol, in Hydrargyri Iodidum Viride,
Carbonate of Lead, in Liquor Guttæ Perchæ.

7. Give the composition of Pulvis Aromaticus, Pilulæ Antimonii Compositæ, Pulveres Effervescentes Aperientes, Mistura Glycyrrhizæ Composita, and Mistura Potassii Citratis.
8. What chemical relation does Glycerin assume in the composition of fixed oils? How is it separated? On what property of Glycerin does the modern process for obtaining it depend? State its specific gravity, solubilities, solvent powers, and tests of purity, as set down in the United States Pharmacopœia.
9. Define the term Alkaloid. State how Morphia, Atropia, Aconitia, Strychnia, and Veratria may be recognized; and give the acid, with which each is combined naturally, in the drugs from which they are obtained.
10. How do you prepare, by the United States Pharmacopœia, Liquor Plumbi Subacetatis, Suppositoria Acidi Tannici, Spiritus Aetheris Compositus, Trochisci Cubebæ, Unguentum Hydrargyri Oxidi Rubri?

QUESTIONS BY THE EXAMINING COMMITTEE. Session 1873–74.

1. State the officinal and botanical name of Squill of Commerce. What part of the plant is used? Give its active principles, medical properties, dose, the officinal preparations in which it enters, and a practical formula for making Vinegar of Squill.
2. What is the percentage of Strychnia in Citrate of Iron and Strychnia? What would be a proper dose? What officinal Salt of Iron contains an acid derived from the animal kingdom? Give the formula for its production, and what effect has boiling Nitric Acid on it.
3. Give the names of five excipients for pill masses, and state which of the five you would prefer to make pills of:

Pyrophosphate of Iron, ...	5 gr. each,
Sulphate of Quinia, ...	2 gr. each,
Compound Rhubarb Pills, ...	U. S. P.;

and give the composition of:
Compound Carthartic Pills,
Compound Iron Pills, and
Compound Squill Pills.

4. Give the locality, natural order, and officinal name of the plant which produces Assafœtida. State how the drug is obtained, and what is its principal constituent. Name all its officinal preparations
5. Give the formula for making each of the following preparations, and the dose of each for an adult:

Acetum Opii,	Tinctura Opii,
Vinum Opii,	Tinctura Opii Acetata,
Tinctura Opii Camphorata.	

6. Give the process for making Precipitated Sulphur, and describe the chemical changes that take place. What is the best test of its purity? State what impurity is generally found in the ordinary Lac Sulphur of Commerce, and in what manner the impurities become incorporated with it.
7. Describe Strychnia as found in the shops. Give the average dose, tests of identity and purity, and name the officinal preparations to which it gives activity, with their doses.
8. Give the ingredients, mode of preparation, strength and doses, of Compound Tincture of Cinchona, Infusion of Digitalis, Syrup of Lactucarium, Compound Pill of Soap, and Ointment of Cantharides.
9. State which of the following prescriptions are proper and which improper, and, in the latter case, the reasons:

A.

℞. Extracti Hyoscyami,
Zinci Oxidi, . . . aa℈ii,
M. div. in pil. XL.
One three times a day for an adult.

B.

℞. Potassi Cyanidi, . . ℥i,
Acidi Citrici, . . gr. ij,
Syr. Pruni Virg.. . . f℥ij
M. S. A teaspoonful every three hours for an adult.

C. F. J. Jones' Child.

℞. Syr. Scillæ,
Syr. Ipecac., . . aa f℥ij,
Liq. Ammonii Acet., . f℥iij.
Tinct. Aconiti Rad., . f℥ss.
M. S. A teaspoonful every four hours.

D. For Hemorrhage.

℞. Liq. Ferri Subsulph , . f℥j,
Plumbi Acet., . . . ℥ij,
Aquæ Dest. . . . f℥iv.
M. Sig. A teaspoonful every two hours.

10. E. Write a formula for a one ounce Hypodermic Solution, of such strength, that five minims shall contain one-quarter grain of Sulphate of Morphia, and one-ninety-sixth grain of Sulphate of Atropia.

How would you dispense the following prescriptions:

F.

℞. Ol. Terebinth., . . f℥ss,
Acaciæ,
Sacchari, . . . aa q. s.,
Tinct. Opii, . . . f℥ij,
Aquæ, . . . f℥iij.
M.

G.

℞. Tinct. Benzoini Comp.,
Liq. Morphiæ Sulph., . aa f℥j,
Mucilag. Acaciæ, . . f℥ss,
Aquæ Camphoræ, . f℥i,
M.

The following specimens were placed on the table for examination by the candidates:

Chemistry.	Materia Medica.	Pharmacy.	Examining Committee.
Sulphur præcipitatum,	Sarsaparilla (Vera Cruz)	Ferri et quiniæ citras.	Cimicifuga,
Acidum sulphuricum,	Leptandra,	Confectio sennæ,	Buchu,
Potassii chloras,	Quassia, (Jamaica)	Pilula ferri carbonatis,	Myrrha,
Sodii bicarbonas,	Rosmarinus,	Extr. colocynth. com. pulv.	Acidum oxalicum,
Sodii boras,	Santonica,		Magnesii sulphas,
Alumen,	Cort. fruct. granati,	Aqua Fœniculi,	Zinci sulphas.
Potasii bichromas,	Cubeba,	Tinct. nucis vomicæ,	Vinum ergotæ,
Ferri subcarbonas,	Physostigma,	Acid sulphuricum arom.	Syrupus Senegæ,
Tinctura ferri chloridi,	Lupulinum,	Extr. sarsapar. comp. fld.	Extr. uvæ ursi fluid,
Hydrarg. chlorid. corros.	Aloe capensis.	Linimentum calcis,	Ung. zinci oxidi.
		Ung. Hydrarg. iodidi rubri.	

The following report was handed to the Board of Trustees, and the gentlemen named therein were duly elected Graduates in Pharmacy:

The Professors and Committee of Examination of the Philadelphia College of Pharmacy, report that the following named candidates, having the required qualifications, have passed their examinations favorably, and are recommended for the degree of "Graduate in Pharmacy."

Their names are set down in the order of merit:

	Name.	State.	Thesis.
1	Edward Seymour Dawson,	New York.	*Juglans Cinerea.*
2	Frederick Belding Power,	"	*Resina Podophylli.*
3	Alexander King,	"	*Maclura Aurantiaca.*
4	William Landon Harrison,	Virginia.	*The Balsam of Liquidambar Styraciflua.*
5	Geo. Martin Shriner Hull,	Pennsylvania.	*Linaria Vulgaris.*
6	Frederick John Kruell,	Illinois.	*Helianthemum Corymbosum.*
7	Francis Joseph Koch,	Iowa.	*Helinium Autumnale.*
8	John Levy Williams,	Pennsylvania.	*The Bitter Principle of Wild Cherry.*
9	Bartholomew Bantley,	Wisconsin.	*Chimaphila Umbellata.*
10	William Dilmore,	New Jersey.	*Actæa Alba.*
11	David Ackerman, Jr.,	Pennsylvania.	*Mistura Assafœtidæ.*
12	Edmund Bakhaus,	Ohio.	*Polygonatum Multiflorum.*
13	Thomas Kramer Hilton,	Pennsylvania.	*Potassium Acid Tartrate.*

14	John Beatty Price,	Delaware.	*Rubus Villosus.*
15	John Joseph Miles,	Mississippi.	*Fluid Extract of Azederach.*
16	John Wm. H. Oppermann,	Pennsylvania.	*Vaccinium Resinosum.*
17	Samuel Benjamin Spence,	Wisconsin.	*Silphium Perfoliatum.*
18	Frank Stewart Savage,	Pennsylvania.	*Syrup Lactophosphate of Iron and Lime.*
19	Jefferson S. Conner,	Indiana.	*The Philadelphia Drug Law.*
20	Rush Blackfan Smith,	Pennsylvania.	*Aconitum Napellus.*
21	Edgar Melville Hattan,	Ohio.	*Cephalanthus Occidentalis.*
22	William Baker Banks,	Pennsylvania.	*Practical Remarks.*
23	Samuel Charles Blair,	"	*Steam Apparatus for Fluid Extracts.*
24	John Warrington Haines,	New Jersey.	*Progress of Pharmacy.*
25	William Francis Dugan,	Pennsylvania.	*Glycerin.*
26	George Christian Lescher,	"	*Saturated Tinctures.*
27	Frederick William Latz,	New York.	*Pharmacy of the Present Time.*
28	John Mumbauer Wert,	Pennsylvania.	*The Apprentices Assistants.*
29	Augustus Henry Keenan,	"	*Zinc.*
30	Adrian Bowens,	Indiana.	*The Constituents of Dr. Sage's Catarrh Remedy.*
31	Henry Solomon Wellcome,	Illinois.	*Urethral Suppositories.*
32	John Markley Rowe,	North Carolina.	*Bromide of Morphia.*
33	George Harris Jacobs,	Missouri.	*Examination of Quinine Pills.*
34	Howard Kingsbury,	Pennsylvania.	*Capsicum.*
35	Charles Johnson Biddle,	"	*Polygonum Hydropiperoides.*
36	Isaac Hansell Rowley,	"	*Pepsin.*
37	William Heckenberger,	"	*Cod Liver Oil.*
38	Eugene Ziegler Hillegas,	"	*The Adulterations of Medicinal Substances.*
39	Frederick Rienhamer,	"	*Affinities of Chemical Attraction.*
40	Robert Hoosie Johnson,	"	*Acidum Tannicum.*
41	David Hunter,	"	*Fluid Extract of Ipecac.*
42	Frank Robert Jummel,	"	*Syrupus Ferri Iodidi, U. S. P. and Ferrum, &c.*
43	Thomas Daniel Terrell,	"	*Digitalis Purpurea.*
44	Augustus Crane Buzby,	New Jersey.	*Remarks on Elixirs.*
45	Isaac Newton Coffee,	Kentucky.	*The Advantages of a Knowledge of Botany to Pharmacy Students.*
46	Edward Everett Hazlett,	Ohio.	*Indigofera Tinctoria.*
47	John Lytle Royston.	Kentucky.	*The History of Medicine.*
48	Thomas Loudes Buckman,	Pennsylvania.	*Phytolacca Decandra.*
49	Harvey Briarley Hutchinson,	New Jersey.	*Oleate of Mercury.*
50	James Aloysius Kinnear,	Arkansas.	*Silphium Laciniatum.*
51	Alfred George Mays,	Pennsylvania.	*Gentiana Lutea.*
52	Edmund Albert Reed,	Illinois.	*Pharmacy.*
53	Thomas Charles Morgan,	Massachusetts.	*Eucalyptus Globulus.*
54	Frank Murrell Budd,	New Jersey.	*Suppositories.*
55	Millard Filmore Tomlin,	"	*Cypripedium Pubescens.*
56	John Frederick Stoltz,	Pennsylvania.	*Preparations of Ferrum Pomatum.*
57	Henry Northam Bryan,	"	*Cypripedium Acaule.*
58	Francis Marion Tilton.	"	*Unguentum Hydrargyri Nitratis.*
59	Franklin Thomas Hartzell,	"	*Commentary on Pharmacopœia Preparations.*
60	Louis Philip Leibold,	Texas.	*Early Closing.*
61	Jonas Eberhart Roeder,	Pennsylvania.	*Chlorinium.*
62	Jacob Hoeckley Hand,	"	*Extracta Fluida.*
63	William Kline Mattern,	"	*Datura Stramonium.*
64	Alexander Wilson Jacob,	"	*Helianthemum.*
65	Abram Lawrence Lumb,	New Jersey.	*Emplastrum.*
66	George Hoopes Johnson,	Pennsylvania.	*Relations between Animal and Vegetable Matter.*
67	Robert Reed Stewart,	"	*Podophyllum.*

68	Charles Sparrow,	Kansas.	*Algarobia Glandulosa.*
69	Alfred Barth,	Pennsylvania.	*Hydrargyri Iodidum Viride.*
70	Charles Ouram,	"	*Anagallis Arvensis.*
71	Joseph Hall Marshall,	"	*Preparation of Sugar Doses.*
72	Benjamin Rowland Morrow,	"	*Advancement of Medicine.*
73	Aaron Peter Jacoby,	"	*Eupatorin.*
74	Francis Henry Ebur Gleim,	"	*Castanea Vesca.*
75	Samuel Edwin Walker,	"	*Solidago Odora.*
76	James Armstrong Allen,	New Jersey.	*Arbutin.*
77	Charles Franklin Goodno,	Pennsylvania.	*Pilula Ferri Carbonatis.*
78	Lewis Kossuth Acker,	"	*Suppositories.*
79	Paul Graef, Jr.,	Ohio.	*Prinos Verticillatus.*
80	George Snavely Henry,	Pennsylvania.	*Urinary Analysis.*
81	Harry Barndollar,	"	*Chloral Hydrate.*

Signed ROBERT BRIDGES, WILLIAM J. JENKS,
JOHN M. MAISCH, SAMUEL S. BUNTING,
JOSEPH P. REMINGTON, ALBERT P. BROWN,
WILLIAM MCINTYRE.

The commencement was held at the Academy of Music on the evening of March 12th, in the presence of a very large and attentive audience. The graduates appeared with crape upon their arms, in memory of Professor William Procter, Jr., deceased. The degree of Graduate in Pharmacy was conferred by the President of the College, Dillwyn Parrish, and the valedictory address was delivered by Professor Robert Bridges. The distribution of bouquets, books and other presents to graduates was conducted under the direction of the Committee on Arrangements, after which the proceedings closed as they had commenced, with music by the Germania Orchestra.

The Summer Course on Botany will commence on Wednesday, April 8th, at 3 o'clock, P. M.

ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHILADELPHIA.—The annual meeting was held in the College Hall, March 5th, 1874, at 3½ o'clock P. M. At this meeting the business of the Association was transacted. The President gave his annual report. The following officers were elected: President, William McIntyre; Vice-Presidents, Jos. P. Remington, and Albert P. Brown; Recording Secretary, Edwin McC. Boring, 10th and Fairmount avenue, Philadelphia; Corresponding Secretary, C. H. Kolp; Treasurer, Edward C. Jones, S. E. corner of Fifteenth and Market streets, Philadelphia; Executive Board, Wallace Procter, Jas. A. Parker, Rich. V. Mattison, E. D. Paxson, and H. B. French; Trustee of Sinking Fund, Thomas S. Wiegand; Orator Lawrence Turnbull, M. D.

It was decided to admit *all* graduates of the College to membership, restricting the right to certificates of membership and annual reports to those who contribute $5, as heretofore, and as the objects of the Association are good, it is to be hoped that all will avail themselves of this privilege.

The public reception to the graduating class, given upon March 10th, at 8 o'clock, in the College, was well attended, the ladies forming a large proportion of the number. The exercises consisted in the annual address by Wm. C. Bakes; calling of new members by the Secretary; presentation of the gold

medal to Edward S. Dawson, Jr., of New York; handsomely engraved certificates for proficiency in chemistry, pharmacy, and materia medica were awarded to the following students respectively: F. B. Power of New York, Wm. L. Harrison of Virginia, and F. J. Kruell of Illinois. Joseph P. Remington delivered an eulogy on the late Professor William Procter, after which a microscopical exhibition was held under the direction of Professor John M. Maisch and Albert P. Brown. An opportunity was afforded for social conversation, and at a late hour all retired from one of the most interesting meetings ever held by the Association.

EDWIN MCC. BORING, *Secretary.*

NEW YORK COLLEGE OF PHARMACY.—At a regular meeting of the trustees of this College, held March 5th, 1874, the following preamble and resolutions were unanimously adopted:

WHEREAS, It has pleased Almighty God, in his infinite wisdom, to remove from this transitory existence our friend Prof. Wm. Procter, Jr., and, whilst mingling our sympathy with that of his bereaved family, let us not be unmindful that "in the midst of life we are in death," and, although possessed of all the enjoyments and comforts of this world, how short the time we may be permitted to partake of them.

Our deceased friend was in the prime of life, enjoying the success of his varied labors in the cause of science and pharmacy, happy and contented, ever ready and willing to diffuse his knowledge to others; his amiability, modesty and spotless integrity, united to a cheerful temperament, endeared him to all who enjoyed the privilege of knowing him.

Alas! in the vigor of manhood, and from off a career of usefulness to his fellow-beings, he was taken away, after a brief illness, and his spirit returned to the God who gave it, but his memory will ever remain among his professional brethren as one who ranked foremost amongst those who labored for the advancement of their profession. Be it therefore

Resolved, That this College deeply deplore the loss they have sustained by the death of Wm. Procter, Jr.

Resolved, That this College tender to the bereaved widow and immediate relatives their sincere condolence in their affliction.

Resolved, That a page in our record book be dedicated to his memory with his name thereon inscribed.

Resolved, That a copy of these resolutions, duly signed by the President and Secretary, be forwarded to the widow of our deceased friend, and the same be published in the "Journal of Pharmacy" and "Druggists' Circular."

At the annual meeting of the College, held March 19th, the following persons were elected: Paul Balluff, President; Wm. Neergaard, Bernard H. Reinold, and Wm. Wright, Jr., Vice-Presidents; Theobald Frohwein, Treasurer; M. L. M. Peixotto, Secretary; H. A. Cassebeer, Geo. C. Close, David Hays, William Hegeman, Ewen McIntyre, Edward L. Milhau, William N. Olliffe, Gustavus Ramsperger, Charles Rice, Daniel C. Robbins, John W. Shedden, Trustees; Paul Balluff, P. W. Bedford, Charles Rice, Ewen McIntyre, F. Alfred Reichardt, Permanent Committee on U. S. Pharmacopœia; Paul Balluff, P. W. Bedford, M. L. M. Peixotto, Gustavus Ramsperger, D. C. Robbins, Delegates to Meeting of American Pharmaceutical Association.

New Jersey Pharmaceutical Association.—At the annual meeting held in Jersey City Feb. 11th, the following officers were elected for the current year: President, James R. Mercein, Jersey City; Vice-Presidents, Randal Rickey, Trenton, and J. De la Cour, Camden; Recording Secretary, Geo. H. White, Jersey City; Corresponding Secretary, Chas. B. Smith, Newark. Executive Committee, A. S. White, Mount Holly; C. H. Dalrymple, Morristown; P. V. Levering and W. R. Laird, Jersey City. The next annual meeting will be held in the City of Camden.

Maryland College of Pharmacy.—The Twenty-second Annual Commencement of the Maryland College of Pharmacy was held Monday evening, March 23d, at Germania Mænnerchor Hall, and the President, John F. Hancock, conferred the degree of Graduate in Pharmacy upon the following gentlemen—the names in the order of merit:

Wm C. Schiller,	Sanguinaria Canadensis,	Maryland.
E. W. Eilau,	Asarum,	"
Edward M. McComas,	Cimicifuga Racemosa,	"
Chas. F. Roehle,	Ricinus Communis,	Prussia.
F. W Koss,	Opium,	Virginia.
Chas. G. Smith,	Helnoias Dioica,	Maryland.
D. E. Schoolfield,	Notes on Chemistry,	Virginia.
Wm. Partlow Thompson,	Scabiosa Succisa,	Maryland.
Oscar Hoffmann,	Antimony,	Prussia.
Henry R. Horstmann,	Hydrastis Canadensis,	Maryland.
Adolphus B. Long,	Actinism,	Ohio.
Ernst Hasenbalg,	Chloral Hydrate,	Prussia.
D. J. Clarke,	Leonurus Cardiaca,	Maryland.
Thos. L. Beckenbaugh,	Notes on Pharmacy,	"
A. Schloss,	Acidum Tannicum,	"

Seven first course students received honorable mention.

The Valedictory Address was delivered by Dr. Wm. Simon, Professor of Chemistry.

The annual meeting of the College convened at 3 P.M., March 24th, John F. Hancock, President, in the chair, Dr. Edward Eareckson, Secretary, thirty members answering to their names. Mr. John F. Hancock presented the College with a copy of Squire's Companion to the British Pharmacopœia, and placed on exhibition the first edition of the U. S. Pharmacopœia, of 1820, also other old works on pharmacy.

A. P. Sharp related reminiscences of the late Prof. Wm. Procter, Jr, locating and describing the house (Cathedral street) in this city in which he was born.

Dr. Joseph Roberts read a paper on conferring the degree of Doctor of Pharmacy, which elicited considerable discussion, participated in by Prof. Moore, L. Dohme and others. The resolutions embodied in the paper were referred to the Committee on Revision of By-Laws.

Mr. Hancock called attention to the use of filtering paper pulp for division

of essential oils in preparing medicated waters, claiming advantages over present method, and exhibiting several officinal waters so made.

After some further discussion, of a conversational character, the meeting adjourned to the "Rose House," where President Hancock introduced to the company present B. Rush Roberts, Esq., formerly a professor of the College, who delivered an interesting address, descriptive of pharmacy as practiced half a century ago. On its conclusion the entire party, numbering near sixty, repaired to the supper-room, and demonstrated their appreciation of the efforts of the Committee of Arrangements by doing ample justice to the substantial repast spread. A series of toasts were offered by the Chairman and appropriately responded to.

J. Newport Potts, Rep. M. C. P.

Louisville College of Pharmacy.—The third course of lectures was attended by 26 students, five of whom, all from Louisville, have received the degree of Graduate in Pharmacy. Their names are placed in order of merit: John Rudell, Henry W. Preissler, Charles P. Frick, Charles O. Frick and William Tafel. The summer course, which is devoted exclusively to botany, will commence on the first Wednesday in April.

The Legislature of Kentucky has passed a pharmacy act applying to all towns and cities of 5000 or more inhabitants. The State Board of Pharmacy is to consist of seven pharmacists, at least four of whom are to be members of the Louisville College of Pharmacy, the selection to be made out of ten nominated by the College. At the annual meeting of March 10th, the following gentlemen were nominated: Emil Scheffer, Fred. C. Miller, Hugh Preissler, Vincent Davis, G. H. Cary, John Colgan, W. W. Smith, S. F. Dawes, W. G. Schmidt, C. Lewis Diehl.

The following gentlemen were appointed a committee to aid Prof. E. Scheffer, the Local Secretary of the American Pharmaceutical Association, in making preparations for the meeting in September next: Lee Beckham, Wiley Rogers, J. A. McAfee, H. A. Pfingst and Ferd. Lingelbach.

The election of the Board of Directors resulted as follows: E. Scheffer, C. Lewis Diehl, Vincent Davis, W. G. Schmidt, S. F. Dawes, Lee A. Beckham, F. C. Miller, W. W. Smith, J. R. McAfee, John Colgan, Ferd. J. Pfingst, —— Shafer. The meeting then adjourned.

The Board of Directors then assembled and elected the following officers: C. Lewis Diehl, President; E. Scheffer, Vincent Davis, Vice-Presidents; S. F. Dawes, Treasurer; F. C. Miller, Recording Secretary; W. G. Schmidt, Corresponding Secretary; J. A. McAfee, Curator.

At a stated meeting of the Board of Directors, held Monday, March 9th, 1874, a special committee was appointed to report at the annual meeting, on the following day, and to draft suitable resolutions as a tribute of respect to the memory of the late Prof. Wm. Procter, Jr., of Philadelphia, which, upon presentation, were unanimously adopted.

Whereas, It has pleased an All wise Providence to remove from his sphere of usefulness our highly esteemed brother Prof. Wm. Procter, Jr., of Philadelphia; and

WHEREAS, The loss of his valuable services for the advancement of pharmaceutical knowledge will be felt and lamented throughout the whole land; be it therefore

Resolved, That the members of the Louisville College of Pharmacy deeply mourn the loss of one who stood highest and foremost in his profession as pharmacist, instructor and journalist, ever faithful, thorough and persevering in the cause which he represented.

Resolved, That we tender to his bereaved family our deepest sympathy and condolence in this their hour of sorrow; but, while we lament with them the irreparable loss, we know that his name and his deeds of merit will live after him among us.

Resolved, That these resolutions be spread on the journal of our College, and a copy of the same be forwarded by the Corresponding Secretary, to the family of the deceased, and also to the Philadelphia College of Pharmacy, with the request of its publication in the next number of the "American Journal of Pharmacy."

FERD. J. PFINGST,
S. FISHER DAWES,
JOHN COLGAN,
} Committee.

WM. G. SCHMIDT, Corresponding Secretary, L. C. P,

CHICAGO COLLEGE OF PHARMACY.—At the commencement, held March 10th, the President conferred the degree of Graduate in Pharmacy upon the following gentlemen: Chas. M. Ford (lacto-phosphates), Littleton Thompson (dilute phosphoric acid), L. C. Hogan (pink root), and E. L. Stahl, Jr. (wild cherry). The valedictory address was delivered by Professor D. B. Trimble.

At the special meeting held February 19th, 1874, the President, Mr. Thos. Whitfield, in a few feeling remarks, announced the death of Professor William Procter, Jr. On motion, a committee was appointed to draft resolutions expressive of the sentiments of the College. Messrs. Sargent, Ebert and Trimble were appointed, and subsequently reported as follows:

IN MEMORIAM.

WHEREAS, The members of this College have learned, with profound sorrow, that Professor William Procter, Jr., departed this life on the 10th instant, and

WHEREAS, We, in common with all pharmacists, mourn the loss of our friend, who has so long maintained the honorable and well-deserved title of the "Father of American Pharmacy," and who has in a busy and eminently useful life done so much to enrich the profession in its literature and in its practice; it is therefore

Resolved, That in the death of Prof. Procter a material loss has been sustained, and the cause of education loses one of its most experienced and ablest champions.

That we deplore the loss of so valuable a life and example to our sister institution and to the whole pharmaceutical body.

That we respectfully offer to the sorrow-stricken family our warmest sympathy in their great bereavement, and will cherish with them the memory of one who has endeared himself to our hearts as a generous friend, a wise counsellor, and a benefactor of his race.

That we extend to the Philadelphia College of Pharmacy our earnest sympathy in their affliction in the loss of one who has so long and ably filled the position of Professor of Pharmacy and editor of their journal, causing the name of their College to be honored wherever pharmacy is recognized.

That in the death of Professor Procter American pharmacists have lost their most honored and ablest leader, a just and noble man, worthy our imitation in all the relations of life.

That as a College of Pharmacy we do hold his name in respectful memory as the first Professor of Pharmacy in America, as a constant friend to pharmacal organizations, and in an especial manner to our own College.

That a copy of these resolutions be sent to the family of our deceased friend, and to the Philadelphia College of Pharmacy, and that they be published in our proceedings.

E. H. Sargent,
Albert E. Ebert,
D. B. Trimble, } Committee.

Cincinnati College of Pharmacy.—The commencement exercises were held March 12th, when the President, Dr. Judge, conferred the degree of Graduate in Pharmacy upon Messrs. L. Schwab, J. H. Sauns, L. Heister, M. Siereveld, T. F. Norwood, C. F. Keener, C. F. H. Laval, A. Delany, E. T. Harley, F. H Nenzel, and A. M. Knerze. An address was delivered by Rev. Thos. Vickers, and the graduates' valedictory by Mr. Norwood, after which Mr. Schwab presented to the faculty a copy of Chambers' Encyclopedia.

At a meeting of the College, March 24th, Dr. Eaton suggested the propriety of taking some action in regard to the death of the late Professor Procter, and presented the following preamble and resolutions, which were unanimously adopted:

Whereas, Professor William Procter, Jr., has, by the inevitable decree of the All-wise Governor of the Universe, been removed from his sphere of labor and usefulness upon earth; and

Whereas, He was an honorary member of this College, and well known to all of us by his life-long devotion to the interests of pharmacy, as well as to some of us personally, we feel it our duty, as it is our pleasure, to bear testimony in an official manner to our appreciation of his great moral and professional worth, to the inestimable benefits he bestowed upon the science and art of our profession by his long and unwearied efforts, and to the great loss all have sustained in his death; therefore be it

Resolved, That in the death of Professor Procter pharmacy has lost one of its most honored, respected and devoted representatives, society one of the noblest and best of men, and his family a most tender and loving husband and father.

Resolved, That to the afflicted family of the deceased, and to our brethren of the Philadelphia College, we tender our heartfelt sympathy in their sad bereavement.

Resolved, That we will, one and all, ever cherish his memory, respect his counsels, and strive to emulate his noble example in our daily lives.

St. Louis College of Pharmacy.—At the commencement, on March 10th, the following gentlemen received the degree of Graduate in Pharmacy: Jas. O'Byrne (nickel), John Farrill (jalapa), Robert C. Schrader (carbo ligni), William Christman (emulsions), J. C. Weingærtner (lead), Robert S. Drake (calamus), John W. Tomfohrde (digitalis), W. R. Hind (powders and pills), Adolph Pfeiffer (hints on prescriptions), Lafayette Hill, Jr. (wild cherry), L. Meyers Connor (arsenic), H. Strassinger (carbonate of lead), F. H. Kenner (arsenic),

Werner Wendelstorff (leaves), Fred. Schmidt (arsenic and its preparations). The valedictory address was delivered by Prof. Hubert Primm.

St. Clair Pharmaceutical Association of Southern Illinois.—At the quarterly meeting, held March 10th, Prof. J. M. Maisch was elected to honorary membership. A memorial was then read, signed by Messrs. A. Rudolph, H. Steingoetter and A. G. F. Streit, setting forth the great utility of a preparatory school of pharmacy, and offering to teach chemistry, materia medica and pharmacy. The report was accepted, and the signers of the report were appointed a committee, with power to take all necessary steps.

Pharmaceutical Society of Great Britain.—At the pharmaceutical meeting held March 4th, Mr. Thomas H. Hills presiding, Professor Bentley gave an account of the origin and uses of coca leaves, of which, according to Johnston, 30,000,000 pounds are annually used in South America.

Mr. Greenish read a note on a decomposed ginger lozenge, which had been made partly of potato starch, but had become mouldy, then absorbed moisture, and finally broke down into a soft granular mass; in the mould a fungus was found, belonging to the same genus as the one to which the potato disease is said to be due; hence Mr. Greenish attributed the dextrin found in the lozenge to be the produce of diseased potatoes, spores of the fungus of which had clung to the starch. Messrs. Hills and Hampson attributed the decomposition to the ginger rather than to the starch; by keeping them in dry, stoppered bottles the mould is prevented.

Mr. Daniel Hanbury read a paper on the Ngai camphor from China, which, from botanical specimens sent by Mr. Fred. H. Ewer, was ascertained to be obtained from *Blumea balsamifera*, De C., a tall, coarse-looking herbaceous plant of Eastern Asia, an abundant weed in Assam, Burma and the Indian Islands. This camphor is sold there at $250 the pecul = 133⅓ lbs., about ten times the price of Formosa camphor, and at one-eighth the price of the best Malay camphor. It is used medicinally, and in the manufacture of the scented Chinese inks. Mr. S. Plowman, in a paper read at the same meeting, describes the crystals and its physical and chemical properties; it is isomeric with Borneo camphor $C_{10}H_{18}O$, but has a different odor, is harder and more brittle, and volatalizes at a higher temperature (158° C.), its boiling point being about 210° C.

Mr. F. Baden Benger, alluding to the paper of Mr. Towerzey,* read a paper, in which he proposes to keep medicinal hydrocyanic acid in a bottle shaped liked the barrel of an ordinary half-ounce syringe, drawn out into a long and fine point at one end, which is sealed in the flame of a spirit lamp or Bunsen burner; it is then filled with the acid, and a piece of vulcanized sheet rubber is tied *tightly* over the mouth. When required for use, the point is scratched with a file and broken off; by pressing the finger on the rubber any amount of acid may be taken out, only the same bulk of air entering the tube when pressure is removed. It is then placed with its point below the surface of mercury

* See American Journal of Pharmacy, February, p 69.

contained in a little upright glass vessel. The diffusion of the vapor of the hydrocyanic acid is almost completely prevented by this contrivance, and no reduction of its strength can therefore take place. Pure rubber cannot be used, the acid vapors diffusing through it. Professor Attfield suggested as an improvement, instead of placing the thin tube into mercury, to draw a rubber cap over a thick quilted extremity.

Centro Pharmaceutico Portuguez.—At the meeting held January 3d, the following gentlemen were elected corresponding members: Antonio A. F. Santa Clara, of Abrunheira; Dr. Felix Martines, of Valencia; Charles Bullock, of Philadelphia; E. Baudrimont, of Paris, and Dr. Davreux, of Liege, Belgium.

Fourth International Pharmaceutical Congress.—A circular letter has been issued, dated St. Petersburg, January 15 (24), 1874, and signed by the President of the Committee on Organization, R. von Schrœder, and the Secretary, E. Rennard. It informs, on behalf of the Pharmaceutical Society of St. Petersburg, that the Fourth International Pharmaceutical Congress will be held in the city of St. Petersburg in August next, and that the following queries for discussion have been agreed upon:

1. How far are assistants personally responsible in the exercise of their professional duties?

2. How may the Committee of Inspection (Revisions Commission) of Pharmacies be most suitably organized?

3d. Is it necessary that the professorship of pharmacy should be occupied by a pharmacist?

4th. Is it not time that an international pharmacopœia be prepared?

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Proceedings of the American Pharmaceutical Association at the Twenty-first Annual Meeting, held in Richmond, Va., September, 1873. Philadelphia: Sherman & Co., Printers, 1874. 8vo, pp. 710.

This volume is just ready, and will be distributed to all entitled early in April, two months later than the editor expected to have it out, notwithstanding the delay before going to press. After the last forms had been put in type, and nearly the entire work was in the hands of the binder, a fire occurring in the building endangered the whole; and, though no loss or damage was done, it occasioned at least another unlooked-for delay.

The volume is the largest ever issued by the Association, that for 1871 excepted, which, together with the decennial index, has only a few pages more, but, without the index, falls about one hundred pages behind. In point of interest, we opine that its contents are even more creditable to the Association, and particularly to the working members thereof, and if, in its perusal, we have any regret to express, it is this—that most of even the most valuable papers elicited comparatively little discussion. Notwithstanding this, the phono-

graphic report is by no means the least interesting portion of the volume; on the contrary, it contains numerous valuable facts and suggestions.

Nearly all the Committee reports are filled with practical and scientific information, and the papers written in answer to queries, as well as the volunteer essays, are mostly of more than mere ephemerous value. The book contains several papers from the pen of Prof. Procter—his last contributions to pharmaceutical knowledge.

Such a creditable volume, it is to be hoped, will be an incentive to all members of this national association to aid in making the next one of equal if not greater value.

Year Book of Pharmacy, comprising abstracts of papers relating to pharmacy, materia medica and chemistry, contributed to British and foreign journals, from July 1, 1872, to June 30, 1873, with the transactions of the British Pharmaceutical Conference at the Tenth Annual Meeting, held at Bradford, September, 1873. London: J. & A. Churchill. 8vo, pp. 588.

On page 523 of the last volume, we have given an account of the Transactions of the British Pharmaceutical Conference, at which a number of interesting papers were read, several of which have been reproduced in this Journal, and others we hope to bring to the notice of our readers, if not entire, at least in the form of an abstract. Many of the papers are followed by very interesting discussions, to condense which is next to impossible.

The principal feature of the volume before us is the "Year Book," which occupies nearly 350 pages, and consists of copious abstracts of the more important papers relating to pharmacy, and contributed to or published in pharmaceutical and other journals; the most important papers have been reproduced *in extenso*. There is, we think, a great improvement in the arrangement of the vast amount of material, as compared with former issues; in fact it leaves scarcely anything to be desired.

The "getting up" of the volume is creditable alike to the Conference and to the Editors.

Proceedings of the Vermont Pharmaceutical Association at the Fourth Annual Meeting held at Burlington, September, 1873. Rutland: Globe Paper Co., Printers, 1874. 8vo, pp. 57.

In our last volume, on page 523, we have reported the meeting, of which the pamphlet before us gives a more complete account. It is a live body, the pharmaceutical association from the Green Mountain State, as is amply testified by the published Proceedings. The addresses and reports presented by the officers and committees have always been to the point, and whatever may appear strange is easily rectified by the free discussion to which expressed opinions are subjected. A case in point, in this pamphlet, is the excellent response of Mr. Rider, of Middlebury, to a paper advocating the use of English instead of Latin for labels and prescriptions, and we expect that another paper, which has all the appearances of a panegyric on patent medicines, will receive a similar good reply at the next annual meeting; it elicited much discussion, as we are informed by the minutes.

We hope that this Association may not be wanting in the council of the Na-

tional Association, in September next; more youthful bodies have presented themselves, and were pleased with their reception.

Tenth Annual Report of the Alumni Association. with the exercises of the 53d commencement of the Philadelphia College of Pharmacy, and the Prospectus for the ensuing course of Lectures Philadelphia: 1874. 8vo, pp. 76.

At the last annual meeting a change was made in the admission to membership; every graduate of the College becomes a member of the Alumni Association by virtue of the Diploma granted by the College, and without paying any fee. Certificates of membership are issued and the printed annual reports are sent to those members only who pay the sum of $5, no further payment being required. This money is used for printing the annual reports, the one before us containing the minutes of the Association and its Executive Board, reports of the different officers and committees, the commencement and the reception of the graduating class, the latter having for the first time been graced by the presence of ladies—and the following addresses: Introductory to the last Course of Instruction, A Historical Review, by Mr. W. C. Bakes; and an eulogy on the late Professor Procter, by Mr. Jos. P. Remington.

A Manual of Botany; including the Structure, Functions, Classification, Properties and Uses of Plants. By Robert Bentley, F. L. S., M. R. C. S. Eng., Professor of Botany, etc. Third edition. London: J. & A. Churchill. 1873. 12mo. pp. 815.

An excellent work, which is particularly adapted to the pharmaceutical and medical student, and well calculated to serve as an introduction to the study of materia medica, since the plants which are useful either medicinally or economically, are treated of somewhat in detail, and many references descriptive of their use have been attached. The extensive material is well and practically arranged, and its adaptation and usefulness for the beginner and more advanced student is conclusively proven by its extensive sale, which rendered this revised edition necessary, only three years after the publication of the second edition. The work is embellished with 1138 wood-cuts illustrative of the matter treated.

Proceedings of the American Academy of Arts and Sciences, Vol. viii. From May, 1866 to May, 1873. Boston and Cambridge: Welch, Bigelow & Co., 1873. 8vo, 680 pages.

A handsome volume, containing many valuable essays and memoirs upon scientific subjects. If we should wish for any improvement, it is the addition of a table of contents, which, we think, is not rendered unnecessary even by such a copious index as the one appended to this volume.

Half Yearly Compendium of Medical Science. Edited by S. W. Butler, M. D., and D. G. Brinton, M. D. Part xiii, January, 1874. Philadelphia: Office of the Medical and Surgical Reporter. 8vo, pp. 298. $3 per year.

Braithwaite's Retrospect of Practical Medicine and Surgery. Part lxviii, January, 1874. American edition. New York: W. A. Townsend. 8vo, pp. 324. Price, $2·50 a year.

Half-Yearly Abstract of the Medical Sciences. Edited by William Domett Stone. M. D. Vol. lviii, January, 1873. Philadelphia: Henry C. Lea. 8vo, pp. 296. Price, $2 50 a year.

The editor of the last named work, which has been published for a period of 29 years, announces that it will be discontinued: but the American publisher has made arrangements for supplying a semi annual digest of the improvements and discoveries in the medical sciences.

Changes of Temperature and Pulse in Yellow Fever. By Joseph Jones, M.D., Professor of Chemistry and Clinical Medicine University of Louisiana. Louisville, 1873.

A reprint from the *American Practioner.* The results of the author's investigations are summed up in the following concluding sentence of his essay.

"It is evident, therefore, that the cause of the rapid rise and sudden decline of the temperature in yellow fever must be sought chiefly in the changes induced by the febrile poison in the *blood*, and in those organs, as the *heart, liver and kidneys*, upon which the circulation and integrity of the blood depends."

OBITUARY.

Thomas Newborn Robert Morson was born at Stratford le-Bow, London, and having lost his parents while yet young, and being then left without a guardian or family connections, was thrown to a great extent upon his own resources; but he overcame all difficulties of his early life, became the founder of a widely known and well reputed business, and the personal friend of many of the leading scientists and artists of his time.

At the age of fourteen he was apprenticed to an apothecary in Fleet Market, (now Farringdon Street), and went afterwards to Paris, to the establishment of M. Planche, where he lived for several years. On his return to England, he established himself in business in the house where he had been apprenticed; and here the sulphates of quinia and of morphia were for the first time manufactured in England, and sold to the wholesale trade at 8 shillings a drachm for quinia, and 18 shillings for the same weight of morphia salt. He subsequently moved to Southampton Row and afterwards built a laboratory in Hornsey Road for the manufacture of chemicals, &c.

He was one of the founders, for many years a member of the Council, four years Vice-President, and three years President of the Pharmaceutical Society of Great Britain, from the Council of which he retired in 1870. He took an active part in the publication of the *Pharmaceutical Journal*, and articles prepared for publication were frequently seasoned, to use an expression of Mr. Bell's, with the "Attic salt" from Southampton Row.

Mr. Morson was a man of enlarged mind and cultivated intellect and his house was a place of resort for men of genius who, on Sunday evenings, found ample scope for the discussion of their favorite topics in his company.

In the early part of January last, he had an attack of paralysis, from which he did not recover; he died at his residence on Queen Street, Bloomsbury, on he third day of March, in the seventy-fifth year of his age.